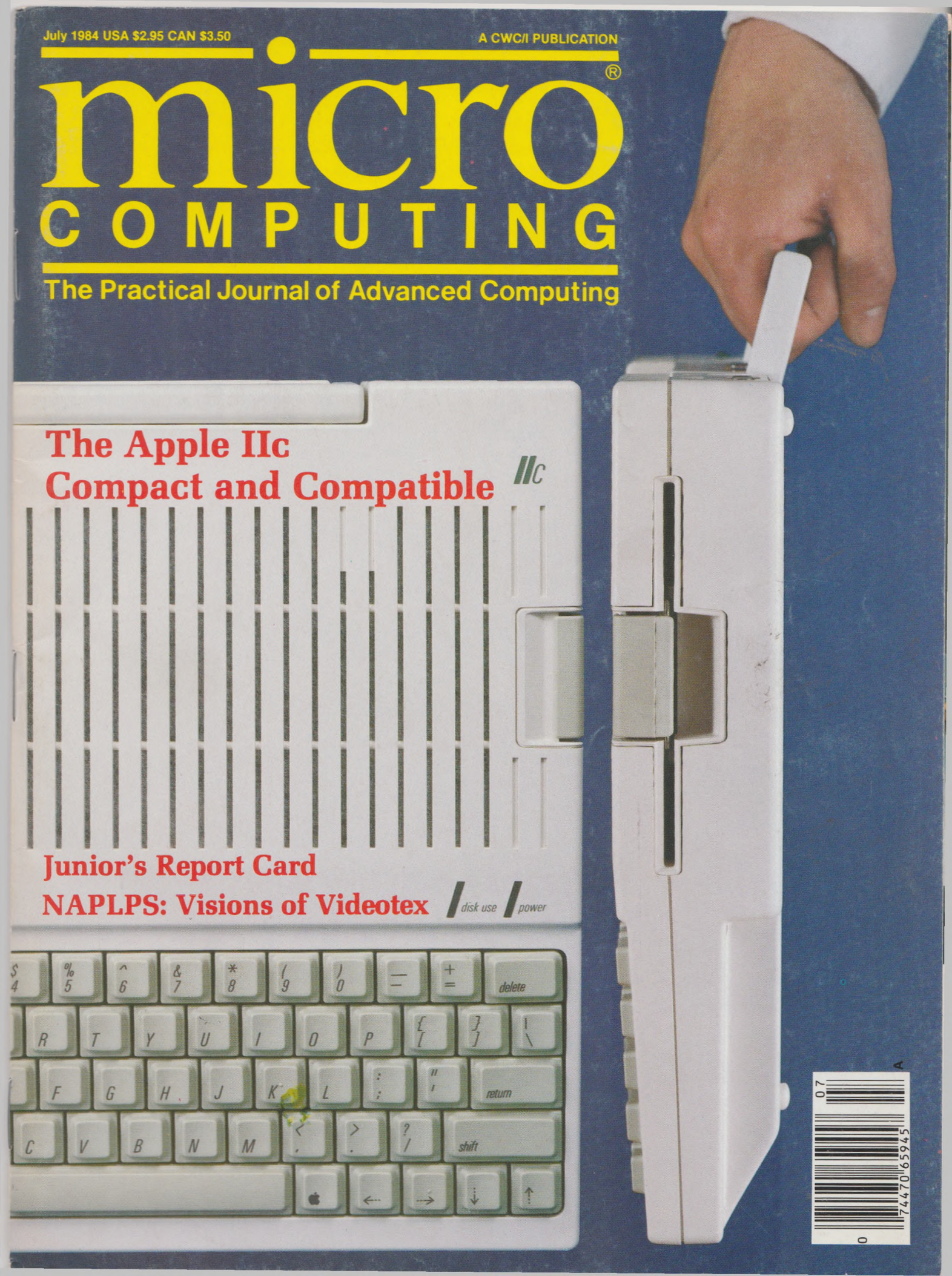
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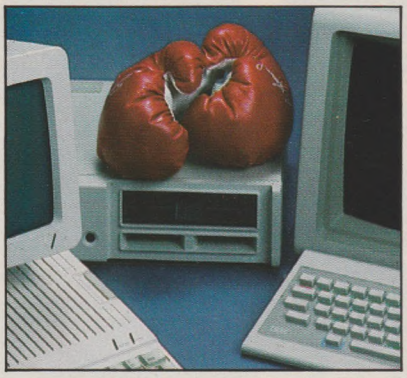
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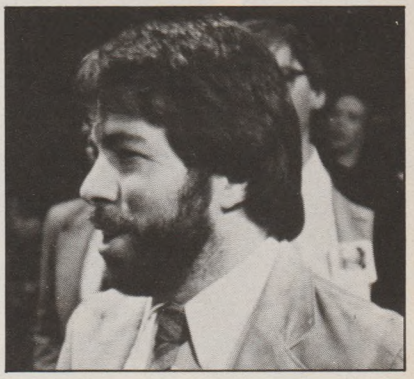
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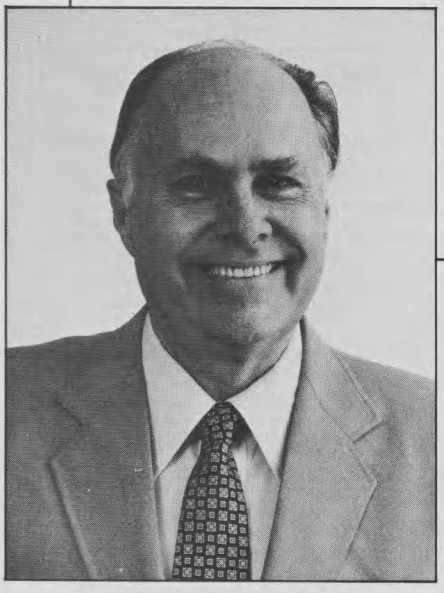
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# Publisher's Remarks

# Eyeing The Future

## Where the Opportunities Lie In the Micro Market



Suppose you really could see into the future—would you be able to do much to take advantage of it? How frustrating to know that something was going to happen—something that you might be able to turn into a profit—and to be helpless to act!

Well, more than a year ago when Radio Shack announced its Model 100 briefcase computer, I had a flash of insight. I knew that in a year or so there'd be dozens of small portable computers. And they'd be better and cheaper than the 100.

In the ensuing year, I've watched some stabs at other briefcase computers, but nothing has come out with enough features to warrant my switching from the 100. Oh, I bought an NEC 8201, mostly to find out if it was different. It has room for twice as much memory and lacks the built-in modem of the 100; otherwise it's similar.

I now use both interchangeably for all of my writing—letters, editorials, memos. I finally got rid of my typewriter and my desktop computer. Both the 100 and 8201 are now always at hand, either at my desk or in my shoulder bag when I'm away from my office.

I tried a Sharp PC-5000, but it was bigger and heavier than the others, and there seemed to be a quality control problem that I never expected from Sharp.

When the 100 came out, the *80 Micro* editorial staff immediately started mumbling about a 100 magazine. Whoa, fellows, you don't start a magazine until there are enough potential subscribers. Besides, since the 100 was only the vanguard of a whole new type of computer, why not think in terms of a magazine for briefcase computers and not just the 100? Rudders eased...

Elsewhere, the action was more impetuous and a 100 magazine was started, only to have serious problems when it turned out that there were few potential subscribers and even fewer firms—known as advertisers—making support products. One does not build much of a magazine without readers and advertisers.

A portable computer magazine that included both the briefcase and strong-arm portable computers was started, and it ran into the same problem. It turned out that just because the Osborne, Compaq and so on were portable, that wasn't a good reason to start a magazine.

**Hitting Pay Dirt**

A briefcase portable magazine was announced and dropped. With about 300 microcomputer magazines, the day when a small publisher can start up a new title and hit pay dirt is past. Heck, just a few years ago, you could show the prototype of a new computer and escallate that into millions; ask Apple about that. Now even AT&T and Xerox are having an interesting time trying to unhorse Apple, Tandy and IBM. Look what happened to TI, Atari and Coleco!

No, today you have to be prepared to invest about a million dollars to get a new microcomputer magazine into the black. This tends to some-

what restrict new magazine entries and to put a chill on adventuresome new titles. The big boys don't want adventure; they want profits, so they behave much like the TV networks with clone after clone of successful magazines—the safe approach.

So, if you've got a million lying around—maybe even a half million—but are not a big publisher and thus committed to safety, a briefcase portable magazine might make it for you. It's going to be a big field in a couple of years, complete with all sorts of add-on products and software, so it's going to need a magazine to help the small firms grow.

Of course, maybe you'd prefer to be one of the smaller support firms. That's something you can still start on the kitchen table or in the garage, if the Apple route to success is your role model. But without a magazine, you'll have a tough time getting going.

One of the reasons why the microcomputer industry was able to grow so rapidly was the proliferation of magazines. Magazines brought small firms together with the customers at a reasonable cost. The opportunities are still wide open for an entrepreneur to make millions in a short time in this industry despite a few large firms grabbing the bulk of the bucks.

**Other Opportunities**

If you just keep up with the growth of the field and give some thought to potential products and services, you'll come up with more projects than Howard Hughes could have financed. I see darned good business opportunities every day, but have to pass them up because my dance card is already filled.

For instance, you've read about electronic magazines, yet we don't really have them yet. Oh, there are some newsletters, but not electronic magazines as I conceive them. And I think the time is ripe to get started.

An electronic magazine might, using current technology, be accessed via the telephone on a daily basis to pick up new pages. This could be via The Source, CompuServe, Easy Link, MCI. . . or it could just be via a bulletin board set up for the purpose. The costs are going to be about the same, line charges plus a subscription fee for the magazine, so it doesn't make a lot of difference.

Subscribers might set their modems to automatically call for pages each morning so that they'd be available to read with breakfast or at work with the morning coffee. Upon logging in, the service would dump maybe five to ten pages of news, features, articles and advertising. Think of the advertising prospects for a daily magazine!

---

The big boys
don't want adventure,
they want profits,
so they behave like TV
networks with clone
after clone of
successful magazines—
the safe approach.

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Manufacturers could wait until their product was ready to be sold in their dealerships and then reach the potential buyers in the morning for an afternoon sale. No more having to worry about secrecy and magazine deadlines, often two and three months ahead of publication.

Less than fanatic subscribers could call in once a week or even once a month and get a dump of the magazine pages. The service computer could check to see when the last page dump was made and bring the subscriber up to date—unless asked not to.

I can see the development of all sorts of interesting electronic magazines—not all in the computer field. If I get some time—and the right people—I might try starting some myself. There'll be lots of room for more, so think about it. This could be a field where a startup might be more reasonable.

There's a need for some progress in technology, if you like that sort of challenge. Getting magazine pages at 300 bits per second (bps) is ridiculous; it adds too much to the line charges. 1200 bps is still far too slow. It's high time that some equipment was developed to provide at least 4800 bps. After all, Bell has designed equipment that is dependable at 9600 bps over ordinary unprocessed telephone lines, so we know it can be done.

In addition to speed, we also need an improvement in graphics. None of the current systems for sending pictures over the telephone lines approaches the graphics capabilities of some of our microcomputers. Okay, we may have to send graphics slower than straight copy, but we're going to need graphics just as much with electronic magazines as we do for print magazines.

At 4800 bps, a full page—about 600 words—would take a little less than seven seconds. At 300 bps, we're looking at almost two minutes. It's 20 minutes for a daily ten-page magazine and thus rather expensive in line charges. If standard characters take that long to send, good color graphics are going to be a major problem—which explains the simple formats of Teletext and NAPLPS, the main graphics systems being used today for wire communications.

**Stores or Mail Order?**

With the development of more and more specialized groups of computer products, it's getting difficult for computer dealers to serve everyone. There has been a wide number of specialized programs for farmers—not big sellers in Manhattan, I suspect. It's also possible that stock market analysis software doesn't play as well in Des Moines as it does on Wall Street. These specialties could be good opportunities to build some new mail-order businesses.

Any of these specialized fields, if there are enough players, will grow as new software and accessories are developed. The specialized mail order house will, in turn, help encourage more people with that interest to computerize—just by making the products so easily available.

Where would the auto marts' business be without JC Whitney? If they folded, which they almost did a couple years ago, I'll bet 500 small businesses would fold along with them.□

# The Edit Mode

By Dan Muse

## A Battle On the Home Front

### The IIc and Junior: An Apple-IBM Showdown?



On April 24, Apple introduced the IIc. Its prerelease hype was nothing like that which preceded Macintosh, but nonetheless, the IIc is revolutionary in its own right. Its release leaves no doubt that Apple has a deep commitment to its II family of products. The IIc also pits Apple squarely against IBM in the battle for the home market.

IBM's PCjr has been suffering from slow sales, and the emergence of a comparably priced Apple II-compatible may serve to further extinguish PCjr's already dying flame.

When IBM released the long-awaited PCjr last November, it ended months of speculation. When the press and then the general public finally got a peek at Junior, the response was an overwhelming "Oh."

Since last fall, Junior sales have been disappointing, to say the least. As PCjrs sit on dealers' shelves, IBM stock has dropped. Many consumers find the Apple IIe is a better investment. Even though the fully configured IIe costs considerably more than Junior, users are swayed by its stable design and the wealth of available software.

In the midst of all this turmoil, the IIc pops onto the scene and Junior's sad predicament seems even more dreary. In essence, the IIc is everything the PCjr is not. Junior is basically a stripped-down PC. Conversely, the IIc offers Apple II compatibility, transportability and the 65C02, a new CMOS microprocessor. Since CMOS chips use less power and therefore produce less heat, the use of the 65C02 allows Apple to fit 41 chips (ten more than the Apple IIe's motherboard) in a system that is 11½ × 12 × 2¼ inches. The 65C02 is not simply a CMOS version of the 6502, it's an improved version that allows for easier programming.

The IIc also offers Apple's new ProDOS. This operating system is compatible with both Apple II's DOS 3.3 and Apple III's SOS. The primary advantage to ProDOS is it allows users unlimited disk storage

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(currently Apple owners are restricted to 143KB per disk). ProDOS also features hierarchical directories.

Apple plans to offer an optional flat-screen display this fall. The 24-line by 80-column LCD will allow the IIc to be transported and used in many places; however, the lack of a battery pack will keep the system out of competition with other truly portable machines, like the Hewlett-Packard HP-110 and the Sharp PC-5000. Apple has announced no plans to produce a IIc battery pack.

### Same Old Chip

Junior features the 8088 and thus can take advantage of some of IBM PC's software, but the system can be expanded to only 128KB, so much of the sophisticated software that runs on PC (e.g., 1-2-3) won't fit Junior's memory limitations. Junior's most innovative feature is its cordless keyboard that operates through an infrared light link—an interesting concept, but there is doubt concerning its practical uses.

> It would be naive for anyone to think that any company could knock a product from the IBM lineup.

### Is Apple Gunning?

Enough said about the physical qualities of the systems. In-depth reviews of the IIc and Junior can be found on p. 60 and p. 88, respectively.

The question to be addressed is: Will the Apple system have an impact on IBM or is talk of an IBM-Apple showdown simply a topic for lively conversation and interesting reading?

First of all, it should be understood that Apple didn't intentionally set its sights on IBM. The plans for the IIc's development were in the works long before there were any mumblings about Junior (or the Peanut, if you recall).

Whether or not Apple is intentionally attempting to add a ding to Big Blue's armor, the IIc cannot help but hurt Junior. When you give the two systems' specifications even a cursory glance, the conclusion is obvious—Apple has produced the superior machine.

It would, however, be naive for anyone to think that any company, even one with as much momentum and technological sophistication as Apple, could knock a product from the IBM lineup.

Junior is still in its infancy and any product with the magical three letters on it cannot be taken lightly. Junior has major shortcomings, but those flaws will doubtless spawn third-party products to make up for Junior's faults. As with the PC, there is money to be made by producing hardware and software products for Junior.

It's also possible that IBM will decide to come out with memory expansion capabilities, a second disk drive and a better keyboard for Junior. Of course, it will have to do this without raising Junior's price—to keep it competitive with the IIc and out of the PC's price range.

It's hard to resist prognosticating on the situation. When you talk Apple and IBM, you're talking about more than computers. It's a classic confrontation: the big, burly IBM against the cunning and imaginative Apple. It's reminiscent of the Spanish Armada vs the British fleet (you do remember your ninth-grade history, don't you?). IBM is big—the biggest. It's so big, in fact, that it has a difficult time adjusting its direction once a course has been set. Apple, though, moves swiftly and strikes quickly and often.

There are many more analogies to be made—the sports analogies are endless—but I'll resist—this time.□

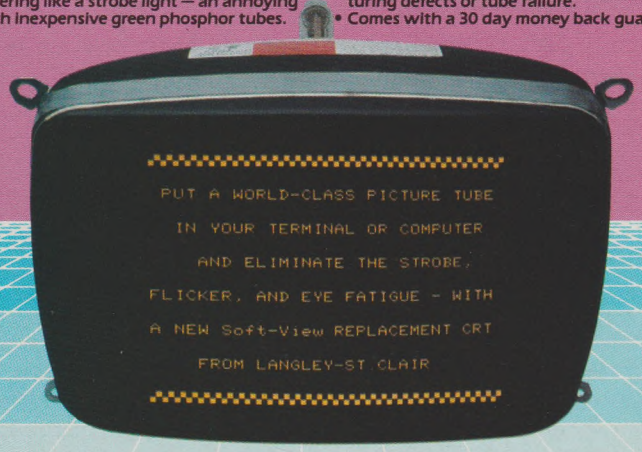
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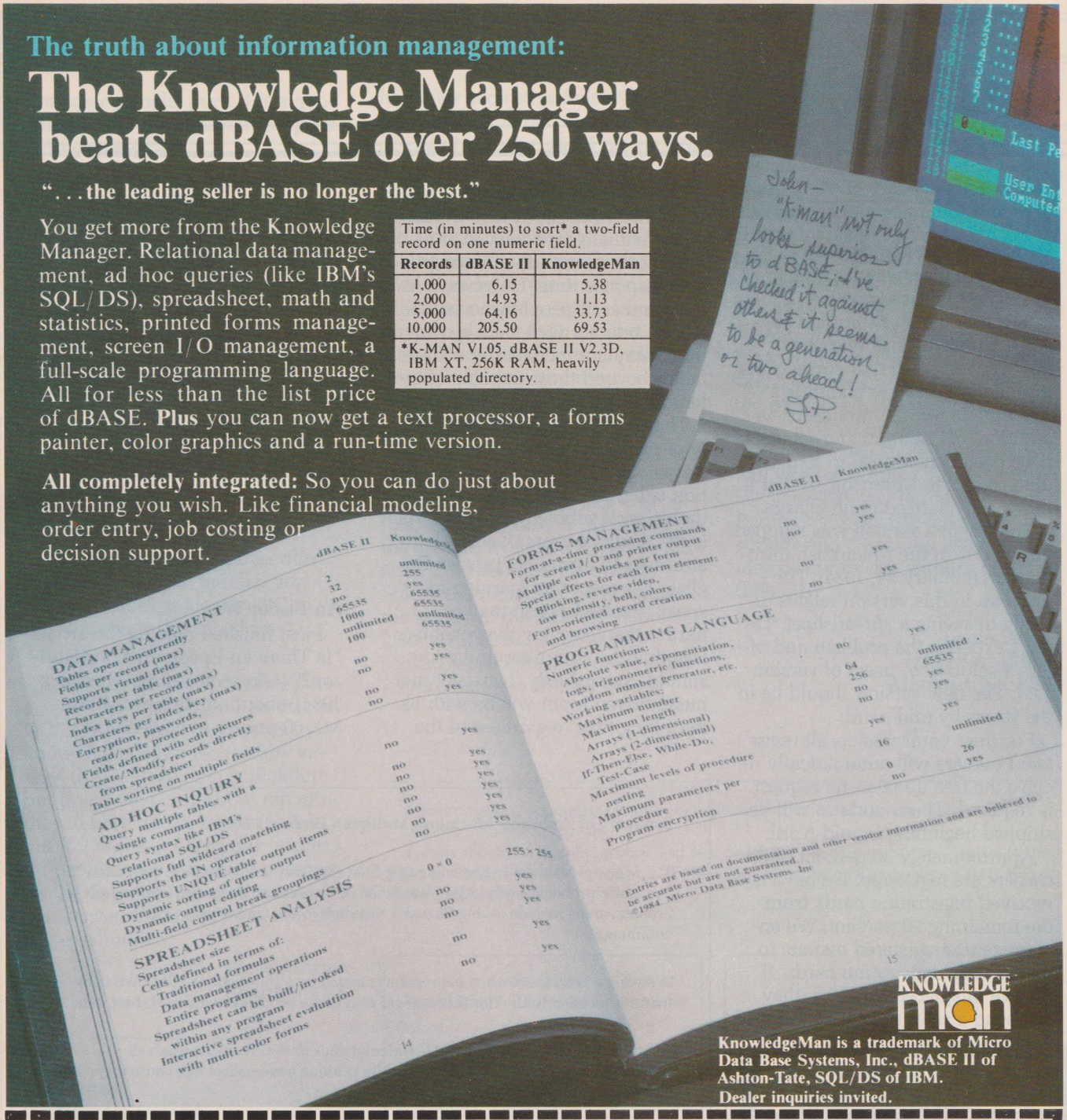
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Circle 38 on Reader Service card.

# Letters

### Microsoft's Free Update Of Macintosh Multiplan

We have discovered a problem in the first released version (1.00) of our Macintosh Multiplan software. Microsoft has released a new version (1.01) that corrects the problem and we are planning a free update for all purchasers. In addition, distributors and retailers have been encouraged to return the product to Microsoft so that it may be exchanged at no charge.

The original version was shipped on the day of the Macintosh introduction (January 24, 1984). The problem in this version relates directly to saving a spreadsheet. Table 1 explains the problem and offers a solution to users of version 1.00. The new version should be in the stores by mid-April.

For their convenience, all registered owners will automatically receive the free update—no request is required. These updates will be shipped beginning in mid-April.

Approximately 30 percent of the owners are registered; we have not received registration cards from the remaining 70 percent. We encourage nonregistered owners to return their registration cards. If they've misplaced the card, they can send a sales receipt as proof of purchase to:

Microsoft Corp.
Customer Service
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Bellevue, WA 98009

We will automatically send them the update.

We would like to emphasize our commitment to providing our customers with responsive, professional support for all products.

**Marty Taucher**
**Senior Public Relations Manager**
**Microsoft Corp.**
**Bellevue, WA**

### Talk to Your Computer

To comment on your editorial in the April issue (p. 8), it's indeed clear that voice input to computers will eventually be achieved at a reasonable cost and with acceptable response time. However, I feel the number of people who will be able to interact with such a computer may not increase by a large factor beyond those capable of interacting with present computers.

The problem is the limited ability of people to make a precise statement or phrase a precise question using ordinary English. We deride legal gobbledygook, but that is the result of years of struggle by attorneys to formulate precise English. I suspect that learning to speak precise English may be harder than learning the vocabulary that the computer understands. Accordingly, I suspect that menu-driven input will be with us for a long time, regardless of the technology used for interfacing the computer to humans.

Generally speaking, I compliment the staff of *Microcomputing*. I've been a subscriber ever since the *Kilobaud* days, and feel your magazine has done a good job of evolving along with the microcomputer art, maintaining a good balance of software and hardware coverage for a wide variety of readers. Congratulations!

**Russell R. Yost**
**Phoenix, AZ**

### An Easier Way

I just finished reading the article "Is There an Epson on Your Horizon?" (*Microcomputing*, March 1984), about attaching an Epson MX-80 printer to a North Star

**Summary of Problems: Macintosh Multiplan Version 1.00**

1. Saving a worksheet in any way other than explicitly using the Save command can cause problems with losing data when the worksheet is opened later. These problem areas include saving files as a response to the Quit, New or Open commands.

2. Saving a worksheet when expressions created by a Fill-Right or Fill-Down command is resident in the Clipboard could also cause problems with worksheet data.

3. Attempting to bring up any of the Macintosh's desk ornaments (such as Calculator, Alarm Clock, Puzzle. . .) while printing a worksheet can cause a system crash due to memory shortage.

**How to Avoid Problems in Version 1.00**

1. Always use the Save command to save a file before using Quit, New or Open.

2. Always make sure the Clipboard is empty before executing a Save command as outlined in 1. The easiest way to empty the contents of the Clipboard is to select an insertion point and then Cut; this will clear the contents of the Clipboard.

3. Do not attempt to bring up any Macintosh desk ornaments while printing.

4. Once a file has been corrupted (i.e., serious system error or strange characters appearing within the cells), dispose of the file by putting it in the trash can.

*Table 1.*

Horizon's parallel port. It is a good article, but I would like to propose a simpler method.

There is only one problem with using the North Star parallel port as designed. The standard Centronics interface specifies a strobe pulse that is at least 1.0 μs wide while the standard North Star parallel port provides a 500 ns wide strobe. However, the shorter strobe works fine with my Centronics model 101A printer; I expect it will also work with most others. Thus, I am using the parallel port as designed, without changing more than the control header North Star put there for this purpose.

The cable required is described in Table 2, and the parallel port control header at location 9C in the Horizon is described in Table 3.

When the standard parallel port is used like this, no changes to the DOS I/O routines are required. I know this hookup technically violates the Centronics specification, but it will take only about ten minutes to wire up the header to find out if it will work for your printer. I'd certainly try it before I patched the DOS, pulled the motherboard and started cutting printed circuit traces (shudder).

**Steve Marum**
**Sherman, TX**

---

### A Cheaper And Faster Hotrod

A method to "hotrod" the Kaypro (March, p. 88) doesn't have to get as "hairy" as Thomas Howe's method. For about $4, you can buy two 14-pin dip sockets and two 14-pin dip headers and use these to rewire the clock. No soldering iron needs to get anywhere near the Kaypro or any of its chips, and the change is completely reversible. It is also easier and faster, because the board doesn't have to be removed.

First, replace the Z80 with the Z80B and then the monitor ROM, testing for proper machine operation after each step. Solder two short jumper wires to pins 4 and 5 of one dip header. Bend out pins 3, 4 and 5 of one of the dip sockets. Solder the unbent pins to the header, and connect the jumper from pin 4 of the header to pin 3 of the socket, and the jumper from pin 5 of the header to pin 4 of the socket. Remove U66, a 74164, from the Kaypro, place it in the socket, replace the assembly and check for proper machine operation.

Now, solder a lone wire from pin 4 of the other header to the center pole of an SPDT switch. Bend out pins 4 and 5 of the other socket. Pin 4 attaches to a wire that will go to the 2.5 MHz pole of the switch, while pin 5 goes to the 5 MHz position on the switch. Solder the remainder of the pins of the socket to the header. Remove U86, a 74LS293, place in the socket, replace the assembly in the Kaypro and test at both speeds.

The method described here assumes the chips U86 and U66 are socketed; some more recent Kaypros have the chips soldered to the board and Mr. Howe's approach is necessary. On some older Kaypros, U67, which should be a 74HC04, might be a 74LS04. This might cause some problems; if any are encountered, replace this chip.

Some more recent Kaypros have RAM chips that are incapable of 5 MHz, so check yours before attempting the speed-up (if the RAM chips, located on the upper left of the board, have 200 on them, they will work at 5 MHz; if the number is 350 or 400, you're out of luck). Radio Shack sells 14-pin dip sockets and 16-pin dip headers that may be cut to size without much difficulty.

**Louis Baker**
**Marion Wilde**
**Albuquerque, NM**

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*Microcomputing* encourages readers to express their opinions and viewpoints in its "Letters to the Editor" forum.

Letters should be doubled-spaced and sent to *Microcomputing* magazine, "Letters to the Editor," 80 Pine St., Peterborough, NH 03458; or contact us on CompuServe (70116,752) or SourceMail (ST8283).

| Signal Name | North Star Connector | Printer Connector |
|---|---|---|
| Data 1 | 5 | 2 |
| Data 2 | 12 | 3 |
| Data 3 | 4 | 4 |
| Data 4 | 11 | 5 |
| Data 5 | 10 | 6 |
| Data 6 | 2 | 7 |
| Data 7 | 9 | 8 |
| Data 8 | 1 | 9 |
| STROBE/ | 8 | 1 |
| ACKNLG/ | 7 | 10 |
| GROUND | 3 | 16 |

*Table 2. North Star-to-printer cable.*

| Connect From | To |
|---|---|
| 1 | 14 |
| 2 | 13 |
| 4 | 12 |

*Table 3. North Star parallel port control header.*

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# Overview

By Frank Derfler, Jr.

# A Dose Of MS DOS

## AT&T and IBM Prowling the Micro Forests

This month in "Overview," I'll take a look at the impact of AT&T in the computer marketplace. But first, I have some comments on advertising, a few ideas about IBM PC-compatible machines, and another hint on how to get rich.

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### Epson's Slip of the Lip

In April, Epson saturated the radio waves in many major cities with a high-cost ad, complete with a background chorus and silver-tongued announcer, praising the "sophisticated Epson. . . so easy to use." The ad was set to the tune of the song "Fascinating Rhythm," obviously a high-quality effort to bring Epson to the attention of potential microcomputer buyers. The only drawback was that the announcer on the ad didn't know a floppy disk from a fly whisk. (I know that the blame is on the producer, but the announcer is the guy you hear.) This very appealing advertisement featured several mentions of the Epson QX-10's compatibility with MS DOSE (sic) (pronounced as this is spelled. . . like a spoonful of medicine).

I heard the ad played during a prime drive-time period and laughed myself silly. How ridiculous to hear an ad for all that precision technology being corrupted by a technically inaccurate mispronunciation. I expected the ad to be immediately pulled and filed away for an appearance on some future program featuring technological bleeps and blunders. I was surprised when days and then weeks went by, while prime drive-time audiences were still given a dose of MS DOSE as they passed their time in traffic. I quickly reached the point where I sacrificed listening to my favorite station just to avoid the opening strains of "Fascinating Epson."

The big blow came, however, when I was in an Entre computer store picking up a new cable for the keyboard on my PCjr. Not only did I hear a customer refer to DOSE, but a salesman acted as if he wasn't sure if the term was DOS or DOSE. It's entirely possible that one radio ad has changed a technical term with a history going back to early IBM mainframe computers.

I've concluded several things from this dose of Epsoms. First, advertising agencies don't have to know much about computers in order to sell them. Second, made-up high tech words have a fragile identity. Finally, we often believe what the media tells us instead of what we know to be true. So now, let's all boot our DOSE and start to compoot!

---

### Want to Get Rich?

Here's an idea that may not bring in millions of dollars in sales, but it could provide a start to an innovative technical company. Besides, I could really use this thing, and I hope somebody sends me one to evaluate.

I believe there's a good market for someone selling the circuit boards to make an IBM PC clone out of an S-100 bus computer system. I don't think you have to sell the S-100 bus cabinets or power supplies; lots of those are out there already. Certainly, the number of North Stars, Polymorphic Systems, Vector Graphics, Imsais, Altairs and other S-100 bus machines doesn't equal the number of IBM PCs in use, but it still represents a large market of people with money invested in equipment who'd

like to upgrade and gain access to the world of PC software at a reasonable price.

I have a Polymorphic Systems Poly 88 that served me well for a while, but I have very little software that will run on its crossbreed of Polymorphic hardware and North Star DOS. It has a beautiful little power supply and a pretty cabinet, but I really need some PC-compatible boards to slip into its slots.

If you're technically inclined and looking for a product to market, here's what you should do. First, you need to come up with a PC-compatible 8088 processor card and disk controller for the S-100 bus. Some very nice S-100 8088 CPU cards and disk controllers are available, but they weren't designed with IBM PC compatibility in mind. Second, you need an S-100 video card that meets or exceeds the exact capabilities of the present IBM Color Graphics card. You should try to allow present S-100 system owners to reuse their existing RAM, but everything else can go.

I'm not talking about a coprocessor that would exist with a present eight-bit processor, but rather I'm talking about a complete wholesale replacement of the CPU, video and disk controller systems. Very often, the disk drives have to be replaced (or at least one new drive added) to provide the ability to format, read and write PC-compatible disks. But the idea of simply adding one 5¼-drive and keeping the existing 500KB eight-inch drives on my S-100 system is appealing.

Finally, if you're really smart, both as a technician and as a marketer, you'll develop an adapter to allow the use of IBM PC expansion cards in the S-100 bus. S-100 bus cards are five inches high. The standard PC cards are 3⅞ inches high. This gives you 1⅛ inches in which to build a circuit card that will mate with the S-100 bus socket and the PC bus card edge and provide the needed buffering and conversions between the systems. The result would probably be an interesting product on its own, but it would be dynamite as part of a PC-compatible S-100 bus card set.

A marketing advantage of this system would be that it allows the users to buy only the pieces they need. They could reuse the power supply, cabinet and maybe the disk drives. Hopefully, they'd be able to reuse some RAM. (The PC uses a ninth parity chip that most S-100 systems don't, but you can get by without it like Eagle does.) You could provide a complete set of cards with 128KB of RAM for about $1800. If you did that, you'd have a very interesting product, and I (for one) would like to know about it.

### Added Value Important

This discussion of PC compatibility brings up a good point. Many authors have defined PC compatibility. The typical approach is to discuss disk compatibility, operating system compatibility, graphics compatibility and other factors. But there's something beyond the consideration of how close to a clone a product is. A major consideration is how much value is added to the product.

The value-added concept is an old one. Many companies take a basic product, add value in the form of additional capabilities and resell the product for a considerably higher price. The Compaq computer isn't just a duplicate of the IBM PC. It performs all of the functions of the PC and adds value in the form of portability (OK, luggability) and combined monochrome and color graphics video. The Sperry and Leading Edge machines provide compatability with improved processing speed, and the new Zenith systems give compatibility with improved expansion capability, color and a full complement of serial and parallel ports.

If you're shopping for a microcomputer system like the PC, you should look for compatibility, but you should also look for the value-added features. The only danger in this kind of shopping is that IBM or some other company might bring out significant products that will only run on IBM systems.

However, the longer the PC stays on the market, the less this becomes likely. IBM has probably made too many changes in the basic ROM to rely on it for special calls, but some code may be hidden away that can be used to check on whether the genuine IBM article is in use. IBM has announced that it is spending at least $500 million through the end of 1984 to improve its PC production facilities. It doesn't sound as if IBM expects PC sales to taper off soon. It also doesn't sound as if the company is going to continue to make it easy for anyone else to take a piece of the market. *Caveat emptor!*

---

## AT&T and IBM

Some people use the analogy that IBM in the microcomputer marketplace is like a tap-dancing elephant. I've argued that I see the company more as a growling and prowling grizzly bear. If IBM is a grizzly, then AT&T is a polar bear of equal or greater size, but less ferocity. These two critters are now prowling a range that overlaps. Many writers have projected that their mutual hunger will result in a tremendous battle, but another possibility is that they can learn to hunt together and drive all of the smaller predators ahead of them.

In April, AT&T released its first publicly marketed computer systems. These first announcements brought out products that aren't really in the category of microcomputers, but microcomputer systems are expected to be released soon, and the larger systems point the way toward what the smaller systems will be.

AT&T's first computer announcements fall almost exactly into the range where IBM is the weakest: the smaller multi-user minicomputer. IBM has some successful products in this area, such as the System 34/36 line, but these machines are the darlings of accountants and CPAs and few others. AT&T hasn't made any inroads into office automation, process control, laboratory support or other major minicomputer market areas. The folks at Digital Equipment Corp. have staked out this turf pretty well, and IBM hasn't made a serious move to displace them. AT&T has initially positioned itself much more directly against DEC than against IBM.

### AT&T's Offerings

AT&T generally calls its computers the 3B line. The 3B systems introduced in April range from the 3B20D super minicomputer to the 3B2/300 that the company calls a desktop supermicro. It's important to understand that AT&T isn't a new computer company. It's made and used its own systems internally for as least as long as IBM has. When you pick up a telephone and dial a long distance number in almost any part of the country, you're communicating with a 3B computer. These larger machines already have a very long history of service under demanding conditions.

All of these newly announced machines use AT&T's 256KB dynamic RAM chips and the Western Electric 32000 32-bit processor. This processor is specifically designed to run with AT&T's Unix operating system. It's interesting to note that the AT&T computers use a great deal of CMOS technology. CMOS (complementary metal-oxide semiconductor) chips use very little power and are normally found in applications such as portable or battery-operated computer systems. Hmmmm, you don't think a 32-bit battery-operated portable could be humming away somewhere, do you? Hmmm?

At any rate, the presently announced systems are designed to run with Unix in the multi-user mode. AT&T is heavily backing Unix V. This version of the Unix operating system has been the subject of a huge advertising campaign and equally large development effort. Microsoft is cooperating with AT&T to support Unix V and Microsoft's Multiplan spreadsheet is one of the first MS DOS products to be converted to Unix. Microsoft announced a long time ago that it was doing its development work in the C programming language that is a part of Unix. That move is now ready to pay dividends. But, you say, you thought Microsoft was the vendor IBM chose to provide the DOS for the PC. How will this support of AT&T affect the relationship of Microsoft with IBM? What about the future of MS DOS on the IBM PC? See the earlier warnings.

Hmmm, you don't think a 32-bit battery-operated portable could be humming away somewhere, do you?

The use of Unix on all members of the 3B series and the money going into Unix development are clear signs that future AT&T personal microcomputers will be Unix machines. Since this operating system seems destined to become so important, let's take a good look at it.

### Unix

The first Unix operating system was developed at AT&T's Bell Laboratories in 1969 by Ken Thompson and Dennis Ritchie to support teams of programmers working within AT&T. Since the early '70s, Unix operating systems have been available at very low cost to educational institutions, government agencies and commercial companies.

Many colleges and universities adopted Unix, and most of the data processing professionals in the country did their college programming assignments on Unix machines. But this popularity with programmers is both a strength and a weakness of the Unix system. It was written for programmers to use, not common people. The commands make almost no sense in English, and the operating system is very picky about both the spacing and punctuation of the nonsense words you have to enter to make it do anything.

Currently, a large number of accounting packages and graphics packages are available for the Unix operating system. Some spectacular graphics are being generated under Unix. But the market lacks many of the kinds of software that's made the microcomputer so popular. The classic Unix word processing system (called the Writer's Workbench) has many powerful features, such as utilities to check grammar and usage along with spelling, but the system is basically designed to produce huge documents printed out on some central high-speed printer. Like so much of Unix, the Writer's Workbench has to be dressed up a great deal before it can have the same appeal to the unsophisticated user as programs such as Easywriter, MultiMate, and even WordStar seem to hold. The introduction of better software for the individual user and a friendlier face for the Unix operating system are critical to the commercial success of Unix.

The Unix III system (marketed by IBM for the PC), Xenix (used by Tandy and other manufacturers) and Unix V (from AT&T) all have many identical features, but they also have some significant differences. Charlie Muir, a professional computer systems manager and an old hand at Unix systems, gave me the following analogy.

Using the name Unix is similar to saying "motor vehicle." There are many kinds of motor vehicles, but if you learn the basic rules of how to make a motor vehicle move and practice a little, you can get into practically any motor vehicle and drive it away. Now you might not get the best performance or economy out of the vehicle without some instruction or additional practice, but you can probably chug down the road in any vehicle you use because you know the basic actions needed to make a motor vehicle go. Similarly, once you learn how one Unix system works, you can probably get a job done on any system, regardless of its size, just by following the basic rules. This means that if you learn Unix and C, you can immediately make some practical use out of a large number of Unix computers that are entering the market.

These new Unix machines, which will be introduced over the next few months by many companies (including Commodore), will range in size and power from personal portables to super minicomputers able to serve more than 100 users simultaneously. Also, because of the large number of Unix versions available, the kinds of processors these new computers use will be much

less important than in the present microcomputer market. You won't know or care what kind of processor the computer system uses, so long as the system has the capabilities and peripherals to do the job you want done.

### An AT&T PC

Rumors persist that AT&T is introducing a personal microcomputer very soon. At this time, it's not clear if this machine will come from Olivetti or Convergent Technologies. Convergent has existing hardware using both the 68000 and 80186 processors running under Unix. The systems Olivetti can provide aren't as widely advertised as those from Convergent Technologies, but AT&T has been actively working on business agreements with the Italian company.

One of the things that AT&T is aware that it doesn't yet know how to do is sell computers. The people in the company are new to retail marketing in general and computer marketing in particular. As an offset to this limitation, AT&T is using several different companies that have experience in selling to different classes of buyers to market its systems. It is also relying on other companies, like Microsoft, to provide the software to run on these systems. In this way, AT&T is copying the "open architecture" policy that brought IBM so much good business with the PC.

### 3B2/300

Since the 3B2/300 is the closest thing to a microcomputer that AT&T has announced, let's quickly examine the system. The 3B2/300 can support up to 18 simultaneous users, but it can be used as a high-powered single-user system too. Physically, the computer is housed in a cabinet that isn't quite as tall as the one used for the IBM PC but is just a tiny bit wider. The system is designed to run with remote terminals instead of an internal video card, so if you want color, you have to pay for a terminal with some expensive capabilities. The 3B2/300 has four internal expansion slots open. A wide variety of hard disk drives, I/O boards and multiple user ports can be added to the system. The basic retail price is just over $10,000.

### AT&T Market Impact

The great advantage of AT&T in the marketplace is it has an operating system that will look and work the same for many different kinds of computers. The disadvantage of the company is its lack of retail computer marketing expertise. It is trying to borrow the expertise from other marketing companies and investing large sums of money trying to make Unix V into the new standard operating system of the computer world. It remains to be seen how effective these strategies will be, but the amount and quality of application and executive support software that becomes available for the AT&T 3B systems within the next few months will tell the story.□

*Contact the author at Box 691, Herndon, VA 22070.*

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# A> The System Prompt

By Edward Joyce

# Diving Into MS DOS

## The Hows And Whys Of File I/O

Buckle your seatbelts; don an oxygen tank. We're going diving, plumb right into the depths of MS DOS. I'm talking Jacques Cousteau-style probing and prying in the lowest recesses of the operating system where few programmers have ever ventured. I'll show you how to massage and masticate data on the home turf of the operating system without the bulletproof protection of an electronic database, without the coddling menus of a forgiving utility program, without the smothering linkage of interpreters, translators and high-level languages. This is serious computing—reaching for the jugular—getting it from the horse's mouth—playing hardball with file I/O function calls.

### Dealing Direct

You have plenty of reasons to deal with PC DOS/MS DOS directly when performing file I/O. First of all, someone has to do it sooner or later. You just can't say to DOS, "Bring me Cliff Barnes' file pronto," as JR might to his secretary on *Dallas*. No, you've got to define a file control block (FCB), set up a disk transfer address (DTA) and decide on sequential or random access, among other esoteric details. High-level languages and database management systems handle these fine points automatically. When designing a language or database, however, a programmer must code logic to convert casual file requests from the user to the stringent structure required by DOS.

Second, attaining optimal performance often means exercising DOS's raw power unencumbered by other software interfaces. Running file I/O at full throttle hardly budges the speedometer if the carburetor linkage is a mile long. Talking with DOS face to face bypasses creature comforts and luxuries that have no place on the racetrack.

Finally, dealing with DOS directly offers total control. File I/O isn't tainted by the idiosyncrasies and conventions of interface software, such as space compression, blocking and end-of-record marks. By playing one-on-one in DOS's home court, you achieve complete authority over the file environment.

Earlier I suggested donning an oxygen tank. With the technical buzzwords per square inch reaching critical mass, you might take a few deep breaths. This discussion of DOS's innards doesn't exactly qualify for cereal box reading. But if you've ever written a program to read or write files, then the material presented here should go down smoothly.

### Deep Black Holes

Later paragraphs refer to assembly language program examples. A background in assembler will help at this point but is by no means a limiting prerequisite. Interfacing with DOS function calls can be performed from most any language, including Basic. The essence of this discussion is how to handle files at that level: in particular, the whens, wheres and whys of using DOS's file I/O function calls.

While it's easy to cite many reasons for communicating in the native state, the vacuum of information for plugging into MS DOS rivals the deepest black holes in the cosmos. My MS DOS user's guide appends 15 pages at the end of the manual devoted to the FCB, eight interrupt requests and 41 function calls. No examples. No how-to

descriptions. FCB isn't even cited in the index. Ascertaining the essentials of performing file I/O from the manual is like trying to acquire a speaking knowledge of the English language by studying a dictionary.

This information gap frequently surfaces at meetings of assembler special interest groups (SIGs) of PC user's groups. Darrell Deming and John Atwood of Rank and File Software Inc. recently helped set the record straight at a presentation before the Alamo PC User Group. Darrell and John generously shared their secrets, which I've incorporated into programs that exhibit the essentials of file I/O.

### The Sequential Case

Listings 1 and 2 illustrate sequential and random file access. The program in Listing 1 creates a file and sequentially writes 150 records to it. The program in Listing 2 then updates two records in the file using random access.

Refer closely to Listing 1 during the ensuing discussion. I'll highlight the areas applicable to file I/O.

The first 140 lines of the program set the stage for the subsequent performance. The equate in line 19 defines the interrupt for interfacing to DOS's function calls. Lines 22–26 equate the function calls used in the program. The interrupt and function calls are described, albeit curtly, in the DOS user's guide.

The next item, the FCB, is also described in the DOS user's guide. The FCB provides the primary mechanism for passing file information between DOS and user programs. Ten fields comprise the 37-byte length of the FCB and all but three may be set by the user. The file size, date and time fields can be read by the user but are updated by DOS.

Of particular importance during sequential access are the current block and current record fields. Both of these have an origin of zero. Together, they specify a particular logical record. In the words of the user's guide, the first field "specifies the current block of 128 records, relative to the start of the file, in which sequential disk reads and writes occur." The current record specifies the actual record within the current block that will be accessed. Consequently, it ranges from zero to 127.

For example, if the current block has a value of one and the current record has a value of sixteen, then the FCB would be set for a sequential read or write of the 145th (1*128 + 16 + 1) record in the file. The DOS user's guide refers to this combination of block/record as the record address.

Following the FCB is the record image in lines 89–100. For the sample file, TESTFILE.TXT, the program uses 75-byte records consisting mostly of spaces.

The first function call to DOS's file I/O support appears in lines 143–145. Here you set the DTA. During write operations, records are transferred from the area specified by the DTA to the disk. Conversely, during reads, records are placed in this same area. DOS doesn't change the DTA after a read or write or at any time, for that matter.

In the program in Listing 1, only one file is opened and all records are written from the same area. Thus, the DTA is set once and left unchanged throughout the duration of the program.

Line 147 shows DX, the data register, being loaded with the address of the FCB. All the file I/O function calls require DX to point to the FCB. The program initializes it once and leaves it permanently set with the FCB address.

### Birth of a File

Next, the file is created. This process enters the filename in DOS's disk directory and opens the file for

*Listing 1. This program demonstrates sequential file access by creating a file and writing 150 records to it.*

```
The Microsoft MACRO Assembler
PROG1 -- Create a sequential file

1
2
3                                       TITLE PROG1 -- Create a sequential file.
4                                       PAGE 40,105                     ; set listing length, width
5                                       ;  Author:        Ed Joyce.
6                                       ;
7                                       ;  Date:          April 3, 1984.
8                                       ;
9                                       ;  Purpose:       Demonstrate MS-DOS/PC-DOS file I/O interface
10                                      ;                   -- create sequential file with 150 records.
11                                      ;
12                                      ;
13                                      ;
14                                      ;*****************************************************************
15                                      ;
16                                      ; Equates.
17                                      ;
18                                      ;  Interrupts.
19  = 0021                              IFUNREQ EQU     21H             ; function request
20                                      ;
21                                      ;  DOS Function Calls.
22  = 0009                              FPRTSTR EQU     09H             ; print string
23  = 0010                              FCLOSEF EQU     10H             ; close file
24  = 0015                              FSEQUWR EQU     15H             ; sequential write
25  = 0016                              FCREATF EQU     16H             ; create file
26  = 001A                              FSETDTA EQU     1AH             ; set disk transfer address
27                                      ;
28                                      ;  CRT Control Codes.
29  = 000A                              LF      EQU     10              ; line feed
30  = 000D                              CR      EQU     13              ; carriage return
31                                      ;
32  = 0024                              EOS     EQU     '$'             ; end of display string
33                                      ;
34                                      ;
35                                      ;*****************************************************************
36                                      ;
37                                      ; Data areas.
38                                      ;
39                                      ;  Stack area.
40  0000                                STACK   SEGMENT PARA STACK 'STACK'      ; align stack
41  0000    C8 [                                DB      200 DUP(0)      ; allocate 200 bytes
42              00
43                  ]
44
45  00C8                                STACK   ENDS
46                                      ;
47                                      ;
48                                      ;  Work area.
49  0000                                WORK    SEGMENT PARA PUBLIC 'DATA'      ; align data area
50                                      ;
51                                      ;  File Control Block (FCB) Definition.
52  0000  01                            FCB     DB      1               ; drive code, use A:
53  0001  54 45 53 54 46 49                     DB      'TESTFILE'      ; file name
54        4C 45
55  0009  54 58 54                              DB      'TXT'           ; file name extension
56  000C    02 [                        FCBCBL  DB      2 DUP(0)        ; current block, start with 0
57              00
58                  ]
59
60  000E    02 [                        FCBRSZ  DB      2 DUP(0)        ; record size
61              00
62                  ]
63
64  0010    04 [                                DB      4 DUP(0)        ; file size
65              00
66                  ]
67
68
```

*Listing continued.*

*Listing continued.*

```
                                ;
0014    02 [                    DB      2 DUP(0)        ; date
           00
                ]
                                ;
0016    02 [                    DB      2 DUP(0)        ; time
           00
                ]
                                ;
0018    08 [                    DB      8 DUP(0)        ; reserved for DOS
           00
                ]
                                ;
0020 00                 FCBCRE  DB      0               ; current record, start with 0
0021    04 [                    DB      4 DUP(0)          random record number
           00
                ]
                                ;
                                ;
                                ;  File Record.
0025 52 45 43 4F 52 44  RECORD  DB      'RECORD NUMBER '
       20 4E 55 4D 42 45
       52 20
0033 30                 RECNHI  DB      '0'             ; record number, hi-order digit
0034 30                 RECNMI  DB      '0'             ; record number, middle digit
0035 31                 RECNLO  DB      '1'             ; record number, lo-order digit
0036    33 [                    DB      51 DUP(' ')     ; pad middle of record
           20
                ]
                                ;
0069 52 43 44 20 45 4E          DB      'RCD END'       ; end of record indicator
        44
 = 004B                 RECLEN  EQU     $-RECORD        ; record length
                                ;
                                ;  Error messages.
0070 0D 0A 0A 0A        ERRCREF DB      CR,LF,LF,LF
0074 2A 2A 2A 43 52 45          DB      '***CREATE FILE FAILED***'
       41 54 45 20 46 49
       4C 45 20 46 41 49
       4C 45 44 2A 2A 2A
008C 0D 0A 0A 0A 24             DB      CR,LF,LF,LF,EOS

0091 0D 0A 0A 0A        ERRWRIT DB      CR,LF,LF,LF
0095 2A 2A 2A 57 52 49          DB      '***WRITE FAILED***'
       54 45 20 46 41 49
       4C 45 44 2A 2A 2A
00A7 0D 0A 0A 0A 24             DB      CR,LF,LF,LF,EOS

00AC 0D 0A 0A 0A        ERRCLOS DB      CR,LF,LF,LF
00B0 2A 2A 2A 43 4C 4F          DB      '***CLOSE FAILED***'
       53 45 20 46 41 49
       4C 45 44 2A 2A 2A
00C2 0D 0A 0A 0A 24             DB      CR,LF,LF,LF,EOS
                                ;
00C7                    WORK    ENDS
                                ;
                                ;
                                ;
                                ;*****************************************************
                                ;
0000                    DISKIOS SEGMENT PARA PUBLIC     ; align on paragraph boundary
                                ASSUME CS:DISKIOS,SS:STACK,DS:WORK
                                ;
                                ;
                                ;
0000                    MAIN    PROC    FAR             ; main logic
                                ;
0000 1E                         PUSH    DS              ; save DOS return
0001 33 C0                      XOR     AX,AX
0003 50                         PUSH    AX
                                ;
0004 B8  ---- R                 MOV     AX,WORK         ; point to our data segment
0007 8E D8                      MOV     DS,AX
                                ;
0009 8D 16 0025 R               LEA     DX,RECORD       ; set disk transfer address
000D B4 1A                      MOV     AH,FSETDTA      ; set DTA function call
000F CD 21                      INT     IFUNREQ         ; perform DOS function
                                ;
0011 8D 16 0000 R               LEA     DX,FCB          ; point to FCB permanently
                                                        ;  (unless if error, in which
                                                        ;   case we abort)
                                ;
0015 E8 003B R                  CALL    CREFILE         ; create file
0018 75 20                      JNZ     EXIT            ;  error?  yes, exit
                                ;
001A C6 06 000E R 4B            MOV     FCBRSZ,RECLEN   ; set record length
                                ;
                                ;
                                ;
001F                    NEXTREC:
001F E8 004E R                  CALL    WRITSEQ         ; write sequential one record
0022 75 16                      JNZ     EXIT            ;  error?  yes, exit
                                ;
0024 80 3E 0033 R 31            CMP     RECNHI,'1'      ; 150 records written?
0029 75 07                      JNZ     STILMOR         ;  no
002B 80 3E 0034 R 35            CMP     RECNMI,'5'      ;
0030 74 05                      JZ      CLEANUP         ;  yes--done
                                ;
0032                    STILMOR:
0032 E8 0074 R                  CALL    INCRNO          ; increment record number
0035 EB E8                      JMP     NEXTREC         ; write next record
                                ;
                                ;
                                ;
0037                    CLEANUP:
0037 E8 0061 R                  CALL    CLOSFIL         ; close file
                                ;
003A                    EXIT:
003A CB                         RET                     ; return to DOS
003B                    MAIN    ENDP
                                ;
                                ;
                                ;
                                ;*****************************************************
                                ;
                                ;
                                ;
                                ; Create file.
003B                    CREFILE PROC    NEAR
003B B4 16                      MOV     AH,FCREATF      ; set create file function call
003D CD 21                      INT     IFUNREQ         ; perform DOS function
003F 0A C0                      OR      AL,AL           ; successful?
0041 74 0A                      JZ      CRFEXIT         ;  yes
                                ;
```

*Listing continued.*

If the DTA is set at 63KB and you attempt to write a 2KB record, DOS will effectively say, "Sorry, Charlie."

subsequent processing. If the file already exists, it will effectively be written over.

When DOS opens the file, it automatically sets the record length field in the FCB to 128. The length field is two bytes, allowing for records up to 64KB. Since our records are 75 bytes long, the program, in line 154, puts that value in the length field. Once set, the length field remains fixed while the file is open.

Darrell and John have had up to ten files open simultaneously. Of course, each file requires its own FCB, which implies that the DX register should be set according to the file being accessed. In this case, you may also wish to change the DTA when switching from one file to another.

Following file creation, the records, including a counter, are written out one by one in lines 159–169 and the subroutines at lines 206–219 and 242–261. A three-character counter is inserted in the record only for accounting purposes. Neither it nor any other field in the 75-byte record have any meaning to DOS.

As mentioned earlier, DOS identifies the record being accessed through the current block/record fields of the FCB. After each record is written, DOS increments the current record. When the current record exceeds 127, DOS resets it to zero and increments the current block. For straight sequential writing, the user program need not touch the FCB after setting the record length. DOS handles all the housekeeping.

**Sorry, Charlie...**

After each write, and any I/O function calls, the program per-

forms obligatory checking of error conditions. If an error is detected, the program issues a terse message and simply terminates.

In a real world application, this logic would probably be more sophisticated; at a minimum, a message explaining the exact condition that caused the error should be displayed.

From the sequential write function call, DOS supplies three condition codes. A zero indicates successful completion; a one indicates a disk full error and a two indicates a disk transfer segment overflow error. The first two conditions are self-explanatory. Explanation of the third condition is best illustrated by an example.

The disk transfer segment is a 64KB region. Its logical address space ranges from zero to 64KB. When a write occurs, the record is transferred to the disk, originating from the area starting at the address specified by the DTA and extending through the record size given in the FCB. If this area exceeds 64KB or if it overflows the segment, the transfer is aborted and a value of two is returned in the accumulator register, AL. Thus, if the DTA is set at 63KB and you attempt to write a 2KB record, then DOS will effectively say "Sorry, Charlie," and stick a two in the return code.

The upper extent of the disk transfer segment essentially restricts reads and writes to a maximum of 64KB. If you'd like to mainline bigger chunks from the disk, you'll have to break them into multiple pieces.

Besides sequential writing, the disk transfer segment overflow condition is also set by the other reading and writing function calls.

The last step in the program is closing the file. Under the CP/M-80 system, many programmers regard closing a file as merely perfunctory. Since it seems to perform no useful service, they often skip it. Under MS DOS, such shortcuts invite disaster. DOS keys off of the close function to flush buffers and update the directory.

Well, that covers a bare bones implementation of sequential access. If you incorporate these drivers in a

*Listing continued.*

```
 193   0043  8D 16 0070 R              LEA     DX,ERRCREF      ; point to error message
 194   0047  B4 09                     MOV     AH,FPRTSTR      ; set print string func call
 195   0049  CD 21                     INT     IFUNREQ         ; display error message
 196   004B  0C 01                     OR      AL,1            ; set zero false, error
 197                                   ;
 198   004D                            CRFEXIT:
 199   004D  C3                               RET
 200   004E                            CREFILE ENDP
 201                                   ;
 202                                   ;
 203                                   ;
 204                                   ; Write sequential one record (writing automatically increments
 205                                   ;  current record/current block in FCB).
 206   004E                            WRITSEQ PROC    NEAR
 207   004E  B4 15                     MOV     AH,FSEQUWR      ; set write sequential call
 208   0050  CD 21                     INT     IFUNREQ         ; perform DOS function
 209   0052  0A C0                     OR      AL,AL           ; successful?
 210   0054  74 0A                     JZ      WRIEXIT         ;  yes
 211                                   ;
 212   0056  8D 16 0091 R              LEA     DX,ERRWRIT      ; point to error message
 213   005A  B4 09                     MOV     AH,FPRTSTR      ; set print string func call
 214   005C  CD 21                     INT     IFUNREQ         ; display error message
 215   005E  0C 01                     OR      AL,1            ; set zero false, error
 216                                   ;
 217   0060                            WRIEXIT:
 218   0060  C3                               RET
 219   0061                            WRITSEQ ENDP
 220                                   ;
 221                                   ;
 222                                   ;
 223                                   ; Close file.
 224   0061                            CLOSFIL PROC    NEAR
 225   0061  B4 10                     MOV     AH,FCLOSEF      ; set create file function call
 226   0063  CD 21                     INT     IFUNREQ         ; perform DOS function
 227   0065  0A C0                     OR      AL,AL           ; successful?
 228   0067  74 0A                     JZ      CLOEXIT         ;  yes
 229                                   ;
 230   0069  8D 16 00AC R              LEA     DX,ERRCLOS      ; point to error message
 231   006D  B4 09                     MOV     AH,FPRTSTR      ; set print string func call
 232   006F  CD 21                     INT     IFUNREQ         ; display error message
 233   0071  0C 01                     OR      AL,1            ; set zero false, error
 234                                   ;
 235   0073                            CLOEXIT:
 236   0073  C3                               RET
 237   0074                            CLOSFIL ENDP
 238                                   ;
 239                                   ;
 240                                   ;
 241                                   ; Increment number in record: number ranges from 001 to 150.
 242   0074                            INCRNO  PROC    NEAR
 243   0074  80 3E 0035 R 39           CMP     RECNLO,'9'      ; lo-order digit = '9'?
 244   0079  74 07                     JZ      CHKMID          ;  yes--check middle digit
 245   007B  FE 06 0035 R              INC     RECNLO          ;  no--increment lo digit
 246   007F  EB 1D 90                  JMP     INCEXIT
 247                                   ;
 248   0082                            CHKMID:
 249   0082  C6 06 0035 R 30           MOV     RECNLO,'0'      ; zero out lo-order digit
 250   0087  80 3E 0034 R 39           CMP     RECNMI,'9'      ; middle digit = '9'?
 251   008C  74 07                     JZ      INCHID          ;  yes--increment hi digit
 252   008E  FE 06 0034 R              INC     RECNMI          ;  no--increment middle digit
 253   0092  EB 0A 90                  JMP     INCEXIT
 254                                   ;
 255   0095                            INCHID:
 256   0095  C6 06 0034 R 30           MOV     RECNMI,'0'      ; zero out middle digit
 257   009A  FE 06 0033 R              INC     RECNHI          ; increment hi-order digit
 258                                   ;
 259   009E                            INCEXIT:
 260   009E  C3                               RET                     ; exit
 261   009F                            INCRNO  ENDP
 262                                   ;
 263                                   ;
 264                                   ;
 265                                   ;*****************************************************************
 266                                   ;
 267   009F                            DISKIOS ENDS
 268                                           END
```

*Listing 2. This program demonstrates random file access by updating two records in the middle of the file.*

```
The Microsoft MACRO Assembler
PROG2 -- Update a file using random access.


 1                                     TITLE PROG2 -- Update a file using random access.
 2                                     PAGE 40,105                     ; set listing length, width
 3                                     ;  Author:       Ed Joyce.
 4                                     ;
 5                                     ;  Date:         April 3, 1984.
 6                                     ;
 7                                     ;  Purpose:      Demonstrate MS-DOS/PC-DOS file I/O interface
 8                                     ;                 -- create sequential file with 150 records.
 9                                     ;
10                                     ;
11                                     ;*****************************************************************
12                                     ;
13                                     ; Equates.
14                                     ;
15                                     ;  Interrupts.
16   = 0021                            IFUNREQ EQU     21H             ; function request
17                                     ;
18                                     ;  DOS Function Calls.
19   = 0009                            FPRTSTR EQU     09H             ; print string
20   = 000F                            FOPENFI EQU     0FH             ; open file
21   = 0010                            FCLOSEF EQU     10H             ; close file
22   = 001A                            FSETDTA EQU     1AH             ; set disk transfer address
23   = 0021                            FRANDRD EQU     21H             ; random read
24   = 0022                            FRANDWR EQU     22H             ; random write
25                                     ;
26                                     ;  CRT Control Codes.
27   = 000A                            LF      EQU     10              ; line feed
28   = 000D                            CR      EQU     13              ; carriage return
29                                     ;
30   = 0024                            EOS     EQU     '$'             ; end of display string
31                                     ;
32                                                                     Listing continued.
```

*Listing continued.*

```
                                ;
                                ;
                                ;*************************************************************
                                ;
                                ; Data areas.
                                ;
                                ;  Stack area.
0000                            STACK   SEGMENT PARA STACK 'STACK'      ; align stack
0000    C8 [                            DB      200 DUP(0)      ; allocate 200 bytes
               00
                   ]

00C8                            STACK   ENDS
                                ;
                                ;
                                ;
                                ;  Work area.
0000                            WORK    SEGMENT PARA PUBLIC 'DATA'      ; align data area
                                ;
                                ;  File Control Block (FCB) Definition.
0000  01                        FCB     DB      1               ; drive code, use A:
0001  54 45 53 54 46 49                 DB      'TESTFILE'      ; file name
      4C 45
0009  54 58 54                          DB      'TXT'           ; file name extension
000C    02 [                            DB      2 DUP(0)        ; current block
               00
                   ]

000E    02 [                    FCBRSZ  DB      2 DUP(0)        ; record size
               00
                   ]

0010    04 [                            DB      4 DUP(0)        ; file size
               00
                   ]

0014    02 [                            DB      2 DUP(0)        ; date
               00
                   ]

0016    02 [                            DB      2 DUP(0)        ; time
               00
                   ]

0018    08 [                            DB      8 DUP(0)        ; reserved for DOS
               00
                   ]

0020  00                                DB      0               ; current record
0021    04 [                    FCBRRN  DB      4 DUP(0)        ; random record number
               00
                   ]

                                ;
                                ;  File Record.
0025    16 [                    RECORD  DB      22 DUP(?)       ; record beginning
               ??
                   ]

003B  ??                        RECUSW  DB      ?               ; record update switch
003C    34 [                            DB      52 DUP(?)       ; record end
               ??
                   ]

= 004B                          RECLEN  EQU     $-RECORD        ; record length
                                ;
                                ;  Error messages.
0070  0D 0A 0A 0A               ERROPNF DB      CR,LF,LF,LF
0074  2A 2A 2A 4F 50 45                DB      '***OPEN FILE FAILED***'
      4E 20 46 49 4C 45
      20 46 41 49 4C 45
      44 2A 2A 2A
008A  0D 0A 0A 0A 24                    DB      CR,LF,LF,LF,EOS
                                ;
008F  0D 0A 0A 0A               ERRREAD DB      CR,LF,LF,LF
0093  2A 2A 2A 52 45 41                DB      '***READ FAILED***'
      44 20 46 41 49 4C
      45 44 2A 2A 2A
00A4  0D 0A 0A 0A 24                    DB      CR,LF,LF,LF,EOS
                                ;
00A9  0D 0A 0A 0A               ERRWRIT DB      CR,LF,LF,LF
00AD  2A 2A 2A 57 52 49                DB      '***WRITE FAILED***'
      54 45 20 46 41 49
      4C 45 44 2A 2A 2A
00BF  0D 0A 0A 0A 24                    DB      CR,LF,LF,LF,EOS
                                ;
00C4  0D 0A 0A 0A               ERRCLOS DB      CR,LF,LF,LF
00C8  2A 2A 2A 43 4C 4F                DB      '***CLOSE FAILED***'
      53 45 20 46 41 49
      4C 45 44 2A 2A 2A
00DA  0D 0A 0A 0A 24                    DB      CR,LF,LF,LF,EOS
                                ;
00DF                            WORK    ENDS
                                ;
                                ;
                                ;
                                ;*************************************************************
                                ;
0000                            DISKIOR SEGMENT PARA PUBLIC     ; align on paragraph boundary
                                        ASSUME CS:DISKIOR,SS:STACK,DS:WORK
                                ;
                                ;
                                ;
0000                                    MAIN    PROC    FAR             ; main logic
                                ;
0000  1E                                PUSH    DS              ; save DOS return
0001  33 C0                             XOR     AX,AX
0003  50                                PUSH    AX
                                ;
0004  B8  ---- R                        MOV     AX,WORK         ; point to our data segment
0007  8E D8                             MOV     DS,AX
                                ;
0009  8D 16 0025 R                      LEA     DX,RECORD       ; set disk transfer address
000D  B4 1A                             MOV     AH,FSETDTA      ; set DTA function call
000F  CD 21                             INT     IFUNREQ         ; perform DOS function
                                ;
0011  8D 16 0000 R                      LEA     DX,FCB          ; point to FCB permanently
                                                                ;  (unless if error, in which
                                                                ;   case we abort)
                                ;
0015  E8 0055 R                         CALL    OPNFILE         ; open file
0018  75 3A                             JNZ     EXIT            ;  error?  yes, exit
```

*Listing continued.*

When the time comes for operating with surgical precision, there's no substitute for working with the real thing.

program, you can verify the results by checking the file size with the Dir command. As expected, Dir lists the file TESTFILE.TXT at 11,250 bytes, which is exactly 75 times 150. DOS inserts no logical end-of-record characters in the file. User programs are left with the responsibility of separating records with carriage returns and/or line feeds, if so desired.

### The Random Case

Using sequential access as a foundation, random access is a piece of cake. The program in Listing 2 demonstrates random access and update of the file created in Listing 1. This program reads the 61st record of the file, updates it by putting a U in the 23rd byte and writes it back out. The program then repeats the update procedure for the 138th record.

The FCB in Listing 2 is nearly identical to the first program with the exception of the labels for the current block, current record and random record number. Since the second program uses random access, it doesn't refer to the current block and record, which are used only for sequential access. Instead, it refers to the random record number.

If the record size is greater than 63 bytes, the random record number may range from zero to 16,777,215. If the record size is less than 64, then the random record number may range up to two to the 30th power.

In line 153, a subroutine is called to open the existing file. While opening the file, DOS automatically sets the record size in the FCB to 128. Since the records in TESTFILE.TXT are actually 75 bytes, the program sets the record length field accordingly in line 156.

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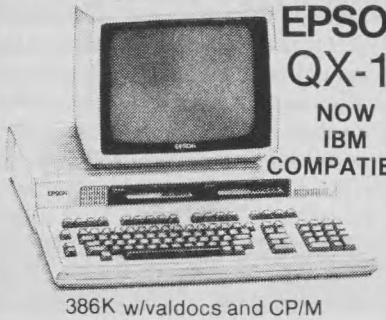
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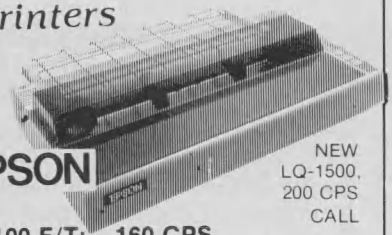


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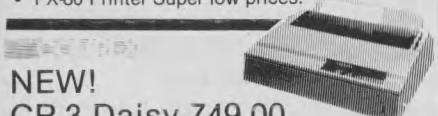
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*Listing continued.*

```
                                ;
001A  C6 06 000E R 4B           MOV     FCBRSZ,RECLEN   ; set record length
                                ;
                                ;
                                ;
                                ; Read 61st record, update it, and write it back out.
001F  C6 06 0021 R 3C           MOV     FCBRRN,60       ; set random record number
                                                        ;  (numbers are relative to 0)
0024  E8 0068 R                 CALL    READRAN         ; read random one record
0027  75 2B                     JNZ     EXIT            ;  error?  yes, exit
                                ;
0029  C6 06 003B R 55           MOV     RECUSW,'U'      ; update one byte of the record
002E  C6 06 0021 R 3C           MOV     FCBRRN,60       ; since DOS increments random
                                                        ;  record number, reset it
                                ;
0033  E8 007B R                 CALL    WRITRAN         ; write random one record
0036  75 1C                     JNZ     EXIT            ;  error?  yes, exit
                                ;
                                ; Read 138th record, update it, and write it back out.
0038  C6 06 0021 R 89           MOV     FCBRRN,137      ; set random record number
                                                        ;  (numbers are relative to 0)
003D  E8 0068 R                 CALL    READRAN         ; read random one record
0040  75 12                     JNZ     EXIT            ;  error?  yes, exit
                                ;
0042  C6 06 003B R 55           MOV     RECUSW,'U'      ; update one byte of the record
0047  C6 06 0021 R 89           MOV     FCBRRN,137      ; since DOS increments random
                                                        ;  record number, reset it
                                ;
004C  E8 007B R                 CALL    WRITRAN         ; write random one record
004F  75 03                     JNZ     EXIT            ;  error?  yes, exit
                                ;
                                ;
                                ;
0051  E8 008E R                 CALL    CLOSFIL         ; close file
                                ;
0054                            EXIT:
0054  CB                        RET                     ; return to DOS
0055                            MAIN    ENDP
                                ;
                                ;
                                ;
                                ;*************************************************************
                                ;
                                ;
                                ;
                                ; Open file.
0055                            OPNFILE PROC    NEAR
0055  B4 0F                     MOV     AH,FOPENFI      ; set open file function call
0057  CD 21                     INT     IFUNREQ         ; perform DOS function
0059  0A C0                     OR      AL,AL           ; successful?
005B  74 0A                     JZ      OPNEXIT         ;  yes
                                ;
005D  8D 16 0070 R              LEA     DX,ERROPNF      ; point to error message
0061  B4 09                     MOV     AH,FPRTSTR      ; set print string func call
0063  CD 21                     INT     IFUNREQ         ; display error message
0065  0C 01                     OR      AL,1            ; set zero false, error
                                ;
0067                            OPNEXIT:
0067  C3                        RET
0068                            OPNFILE ENDP
                                ;
                                ;
                                ;
                                ; Read random one record.
0068                            READRAN PROC    NEAR
0068  B4 21                     MOV     AH,FRANDRD      ; set read random call
006A  CD 21                     INT     IFUNREQ         ; perform DOS function
006C  0A C0                     OR      AL,AL           ; successful?
006E  74 0A                     JZ      READEXIT        ;  yes
                                ;
0070  8D 16 008F R              LEA     DX,ERRREAD      ; point to error message
0074  B4 09                     MOV     AH,FPRTSTR      ; set print string func call
0076  CD 21                     INT     IFUNREQ         ; display error message
0078  0C 01                     OR      AL,1            ; set zero false, error
                                ;
007A                            READEXIT:
007A  C3                        RET
007B                            READRAN ENDP
                                ;
                                ;
                                ;
                                ; Write random one record.
007B                            WRITRAN PROC    NEAR
007B  B4 22                     MOV     AH,FRANDWR      ; set write random call
007D  CD 21                     INT     IFUNREQ         ; perform DOS function
007F  0A C0                     OR      AL,AL           ; successful?
0081  74 0A                     JZ      WRIEXIT         ;  yes
                                ;
0083  8D 16 00A9 R              LEA     DX,ERRWRIT      ; point to error message
0087  B4 09                     MOV     AH,FPRTSTR      ; set print string func call
0089  CD 21                     INT     IFUNREQ         ; display error message
008B  0C 01                     OR      AL,1            ; set zero false, error
                                ;
008D                            WRIEXIT:
008D  C3                        RET
008E                            WRITRAN ENDP
                                ;
                                ;
                                ;
                                ; Close file
008E                            CLOSFIL PROC    NEAR
008E  B4 10                     MOV     AH,FCLOSEF      ; set create file function call
0090  CD 21                     INT     IFUNREQ         ; perform DOS function
0092  0A C0                     OR      AL,AL           ; successful?
0094  74 0A                     JZ      CLOEXIT         ;  yes
                                ;
0096  8D 16 00C4 R              LEA     DX,ERRCLOS      ; point to error message
009A  B4 09                     MOV     AH,FPRTSTR      ; set print string func call
009C  CD 21                     INT     IFUNREQ         ; display error message
009E  0C 01                     OR      AL,1            ; set zero false, error
                                ;
00A0                            CLOEXIT:
00A0  C3                        RET
00A1                            CLOSFIL ENDP
                                ;
                                ;
                                ;
                                ;*************************************************************
                                ;
00A1                            DISKIOR ENDS
                                END
```

At line 163 and the corresponding subroutine in lines 219 to 232, the first record is read. This is accomplished through the DOS random read function call. Following the read, the record update switch is modified and the record is written back out. The only tricky aspect of updating is keeping track of the FCB random record number. Upon completing the read, DOS automatically increments the random record number. Thus, to write the updated record back out to the same position in the file, you must change the record number to match its original value. This is done in line 167.

For random access, DOS also offers block reads and writes (function calls 27 and 28 hexadecimal). These function calls can significantly improve performance by working with blocks of records.

### Surgical Precision

Overall, accessing files through DOS function calls is relatively straightforward once you've seen it done. DOS handles many messy details, including media type. Function calls or parameters for specifying floppy or hard disk aren't necessary. DOS takes care of that automatically and it's transparent to the user program.

The programs outlined here are vanilla implementations that work under any version of DOS, including 2.10. They incorporate no optimization but merely illustrate file I/O concepts. The earnest programmer can, for example, enhance the performance of the sequential program by buffering the 150 records in memory and plopping them on the disk in one fell swoop with a single call to the random block write function.

To summarize this lesson, on a few occasions you may have to stoop to the lowest levels of DOS. More often than not, the programmer is delighted to hand the hassle over to a database system or high-level language. But when the time comes for operating with surgical precision, there's no substitute for working with the real thing. In those situations, the hows and whys of file I/O are virtually priceless.□

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# The Database Manager

By Shawn Bryan

# dBase II Armchair Tutorials

## Power and Ease: These Databases Do It All

The power of database management programs is so exciting. We all have a need for order in our lives. Database managers put the information we deal with on a day-to-day basis into some order. As a result, they're inherently appealing.

Unfortunately, that appeal rapidly dissipates when it comes time to learn how to use these programs. The power they have is offered, often, at the expense of ease of use.

In this month's column, I'll take a look at two training programs for dBase II, one of the most difficult database managers to learn to use. I'll also review Dataease and Powerbase, two menu-driven relational database management programs that claim to offer ease of use and power. I'll fill you in on what it takes to support a program once it's created and sold and take a peek at PC Focus, a mainframe database manager that's been transported to the IBM PC and compatibles.

---

### Disk University: dBase II at Home

American Training International and Cdex are probably the two best-known companies creating training and tutorial programs. Both companies quickly realized the potential market for a good training program on dBase II and offered it. Since they use different training techniques, it's interesting to compare the two styles to find out which one is more suited to your needs.

American Training International (ATI) offers a two-disk training program called Teach Yourself dBase II. This is actually a two-volume program, but each volume can be a free-standing training course. Volume 1 covers setting up and maintaining a database while Volume 2 covers programming in the dBase II language.

ATI's approach to training is unique. Its intent is to teach you basic skills that help you produce as fast as possible. It doesn't cover theory or little-used skills. Its goal is to acquaint you with the most-used skills in about two hours. Since it takes most people months to become productive with dBase II, two hours is a bold claim.

#### Quick Start

When you first use ATI's programs, you're struck with the paucity of documentation. The manual tells you how to start the program and then describes the commands covered in the disk-based program. The documentation uses a get ready-start-finish approach that is very abbreviated. Each command or action is described in brief detail in the manual. Clearly, ATI expects you to use the manual as a quick reference, not a text book.

To its credit, ATI makes the best use of the tools available to teach you dBase II: the computer you'll use it on. Using a computer to teach a program like dBase II is worth the effort. Ashton-Tate realized this when it decided to write a tutorial program for dBase II. ATI was there first, however, and has done a good job.

The screens used by ATI are split into two windows. The top window shows the screen as it appears on the computer; the bottom window tells you what ATI is teaching. Color is used effectively to make the screen interesting and to highlight important points. The pace of the lessons is about right—a little on the slow side for me, but I've worked

with dBase II for some time. If you've never seen dBase II before, I think the training rate is fine.

### Two Changes

I have only two criticisms for the people at ATI. First, you should be able to review or back up to recover a difficult subject without going back to the menu and starting a whole section over. Perhaps the point you want to cover again is back just one step.

Second, ATI occasionally refers to a command you'd like to cover in detail in the dBase manual, but the command isn't named. For example, the tutorial discusses the trim function, but then the program says you may be interested in another way of doing the same thing. Unfortunately, that's the end of the discussion—no references as to where to look or what to look for. Fortunately, this isn't normally the case.

### Cdex Training

Cdex uses a more comprehensive approach to training. It starts by explaining the concepts behind database management programs. The tutorial then moves on to cover dBase commands, programming language and sample applications. The documentation covers many of the most important dBase commands in depth, using a definition, syntax, examples and tips format. A great deal of useful information is in the manual as well as in the training program.

When you start up the program (it's self-booting since it's written in Pascal and runs under the UCSD Pascal system), you're asked to give the program your name. Rest assured that, from that point on, the program addresses you like a big brother or sister. Cdex makes excellent use of graphics and color. Error messages appear in bright colors accompanied by appropriately sad music. Correct responses are rewarded with bright messages and cheerful music.

Cdex also uses a test/review method. After each section, you're tested on what you've learned. Then the program reviews the material. If you're unsure of the material, you may review the lesson before trying to respond. Cdex has tried hard to help you understand both how and why to do it.

The crux of the difference between ATI and Cdex is found in that last sentence. ATI shows you how but isn't concerned with why. Cdex takes a more traditional approach and gives you the answers to some of the whys. If you want to get up and running fast and don't care too much about why the program works the way it does, ATI may be for you. On the other hand, if you want a more traditional education in dBase, Cdex offers more comprehensive material.

Before you buy either program, take a look at the Ashton-Tate tutorial. It may be all you need to get started. In addition, both ATI and Cdex suffer from the problem of information lag. dBase II is on version 2.4 with new versions in the works. ATI and Cdex will have to rework their programs constantly to keep up with the changes, so make sure you get one that covers the current version of dBase.

---

## Support: More Than Disk and Binder

Most of us have, at one time or other, bemoaned the high cost of software. It's natural when you consider a disk costs less than a dollar and the materials to support the program (the documentation) probably cost only a few dollars to produce. The temptation to borrow a friend's disk and copy the program is almost irresistible. You rationalize that the product is a rip-off and the company is making obscene profits.

I visited Alpha Software's new plant in Burlington, MA, the other day and realized the investment Alpha has in making good software and backing it up with service. It's a small plant by large industrial standards, but it's not a kitchen table operation, either. As I took the tour, I was impressed with the number of PCs I saw and the number of people there to back up the program with sales support and customer support. Alpha is obviously dedicated to making sure its program works on every IBM compatible available—one of each kind is in the plant.

Alpha is also working on a new product, Data Base Manager V. I tried it out at the plant. It's easy to use and powerful. Keep your eyes open for product announcements. Alpha will also offer upgrades to owners of the Data Base Manager II program for a special upgrade price, another example of why it pays to purchase, not steal, a program. If you're a registered owner of DBM II, you'll be contacted about the upgrade. If not, you'll be out of luck. This is also an example of responsible management by the company. The loyal purchasers of the original program won't be left out in the cold when the new version is released.

The next time you grumble about what you have to pay for a software product, remember that having someone to call with a problem counts for something. If you can call and get an answer to your problem, you've just found out why you paid a fair price. If you call and there's no response but you got a good deal—then maybe you really didn't get such a great deal after all. What good is a product you can't use? As for copying the program you borrowed from a friend, don't do it. It's stealing, pure and simple.

---

## Power-base and Dataease

The two programs I'm reviewing this month are Power-base and Dataease. Power-base received rave reviews for its documentation and ease of use as well as its power. Some rather large firms have endorsed Dataease and claim it has sped up their database management programming efforts by factors of ten or more.

I like both of these programs, and you'll see why as I review them. For vital statistics, see Table 1.

Both programs stack up well as fully relational database managers. Both programs are menu-driven, and the learning periods for both are relatively short. Dataease is written in C. Power-base is written in compiled Basic, C and assembler.

Dataease is not copy protected; Powerbase is.

Both programs use a screen-oriented database creation method. You create on the screen the form you wish to use for data entry and the fields are defined as you create the form. If you're beginning to think these two programs are similar, they are. But they also have some very different features, so let's examine each program to discover if the riches they offer are fool's gold or the real thing.

**Prospecting for Rich Treasure**

Dataease, from Software Solutions, is an extremely powerful and flexible database manager. It has a few rough edges that are being polished and the documentation is still being improved, but overall, this program has few limitations and some features that are real gems.

The first thing you see when you start Dataease is the panoply of color that greets you (on a color monitor). Dataease relies heavily on the use of color to highlight important information and guide you through the program. Creating a new database is as easy as selecting choice one from the main menu (Form Definition and Changes).

A form name may be up to 20 characters long, a useful feature since the database can be given a descriptive title rather than an eight-character filename. The program next takes you to the form editor, a blank screen where you type in the field names and then define the types of information to be placed in those fields.

Multipage forms are allowed if you can't get all the desired information on one page or if it makes more sense to break your input up into related screens. You may either enter the prompt language and then define the field for that prompt or you can type in all of your text and then go back and define your fields. The program will work either way.

During editing, the function keys are available to aid in the process. By positioning the cursor at the place you wish a field to begin and pressing the F10 key, you enter the field definition phase of the program. The first prompt is for field name. The program picks up the text to the left of the cursor by default and asks if that's the field name you wish to use. If it is, you press the enter key; otherwise you type in the field name you wish to use. If you have already used the field name in the form, the program warns you to pick another name.

The next step is to define the field type. In addition to the normal character and numeric fields, Dataease has a useful Choice feature that permits the creation of multiple choice fields.

The multiple choice field allows the creation of a menu of up to 15 correct responses. When you enter data to the program, you're permitted to select only the responses preprogrammed for the form—a great timesaver and spacesaver when you're working with a large file. The choice fields take up considerably less space than text fields conveying the same information. In addition, the choices offer good data entry validation because only predefined choices are acceptable responses.

Dataease also permits the creation of numeric strings. These strings are numbers you won't normally use in calculations. They're saved as strings and can take many forms. Predefined forms are for telephone numbers and social security numbers. Other formats may be defined, such as for a nine-digit zip code.

Numeric fields may be defined as either floating or fixed decimal point, or as integers, dollar fields, date or time fields. These numeric fields can all be used in calculations. Finally, fields can be logical—that is, yes or no fields.

The balance of the information about the field may be skipped if the program defaults are acceptable. The defaults include whether or not the field is required, if it's indexed, if it's unique (no other entry in this form can have the same characteristics), if it should fall within a certain range and if it's derived, calculated or looked up. Without going into further detail, it's clear that almost every possible data entry situation has been anticipated.

Data entry is merely a fill-in-the-form excercise. You're prompted for correct responses where appropriate.

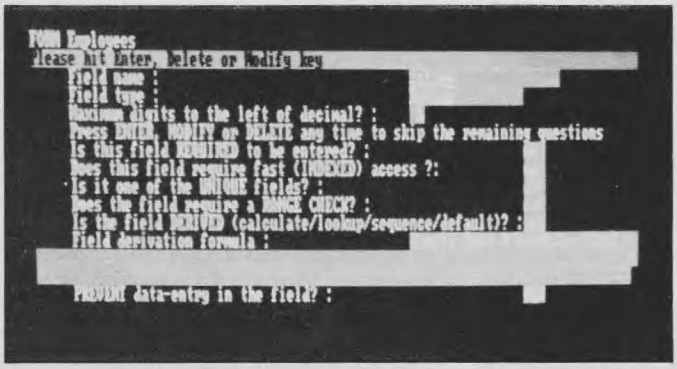
Dataease doesn't stop at simple data entry and retrieval. You may also use Dataease to set up your own menus and thereby design your own system. A menu may have up to nine choices. Each menu selection may be tied into the security system used by Dataease, protecting your data from unauthorized tampering. A menu may call another menu. Unlimited nesting of menus is permitted, and an unlimited number of menus may be defined.

**Report Form Options**

No database manager is worth much if you can't get information back out of the program. Reports in Dataease can take almost any desired form. Three predefined report formats are provided. Columnar reports arrange the fields of information in columns, one under the other. The field-per-line format creates a report with a single field per line. Most useful for many people will be the DIF option, which formats the file output to the DIF standard. Using DIF, data from Dataease can be moved to and from a number of programs, including spreadsheets, other database managers, word processors and statistical packages. Using the DIF standard opens the door to countless other programs.

The fourth option is the user-defined format. This option has no limit to the way in which you can report your information. I find the ability to write form letters and extract names and addresses from the files is one of the most useful features of the program. A report can be a full page of typed text with data inserted in the text where you need it. Billing systems, mailings, statements, almost anything you can define can be reported.

The creation of relations with Dataease is also menu-driven. After you select the Menus and Relationships menu, a submenu appears from which you should choose Relationships. The Relationships form appears and you fill in the blanks, defining how the two files are




*Dataease field definition screen. Prompts makes field definition painless.*

| | Dataease | Power-base |
|---|---|---|
| Records per file | 65,535 | 65,535 |
| Characters per record | 8000 | 1600 |
| Fields per record | 255 | 64 |
| Characters per field | 255 | 80 |
| Number of files open | Unlimited | 64 |
| Uses color | Yes | No |
| Memory required | 128KB | 256KB |
| Price | $595 | $395 |

*Table 1. Comparison chart.*

related. Once the relationship between the files is established, the query language is used to extract data from each related file that meets the select criteria you've established.

Dataease uses a query language or programming language to give you the utmost in flexibility when you're selecting information from a file. This language is like that used in many database management systems, although more limited than a language like dBase II or KnowledgeMan. Nonetheless, very powerful reporting procedures are possible.

### Shortcomings

What are the shortcomings? First, the program language isn't well-documented. No dictionary of terms and syntax is provided. The examples section is excellent, but it takes too long to find out how to program a query using the samples. Also noticeably missing is a quick reference card. This inexpensive but useful addition would make using the program much more fun.

The manual is well-done, and I found it to be helpful, but some sections need more work. A list of the error messages and corrective actions isn't provided. It should be. As noted above, the query language isn't as well-documented as it could be. Dataease supports only multilevel ascending sorts, which is a little unusual in a program with so much flexibility. This should be expanded to allow multilevel ascending and descending sorts.

Software Solutions has been releasing updates to Dataease on a regular basis. The first couple of versions had more bugs than anticipated, but Software Solutions has a good track record for getting the updates out. The version tested here was 2.04, and I was informed that 2.05 is already well under way. Technical help is available from the company by phone for the problems you can't seem to get around. Other programs under development are Wordease and Graphease. The program is backed up with a 30-day unconditional money-back guarantee. It works and works well. If this description has piqued your curiosity, give it a further look. It's worth it.

### More Power with Power-base

Power-base, the other program in this comparison, has many of the same features as Dataease but is also different. As you can see from Table 1, Power-base is somewhat more limited as far as field size is concerned. It also doesn't have as many features as Dataease, but it's easier to learn and has built-in help files. These features may make it more appropriate for you if your application requires people with little or no computer background and experience to use the program. They'll find getting up and running with Power-base less intimidating than Dataease.

Power-base uses a "magic fingers" approach. The F8, F9 and F10 keys are used to make selections from the menus. The menus appear at the bottom of the screen and the F9 moves the selection cursor left; the F10 key moves the selection cursor right. When you have moved the cursor to the correct position, the F8 key makes the selection. Once you're used to this method of selection, it becomes second nature. The only other active function key is the F1 key, which signifies you are done with what you are doing.

### Goof Proof

The escape key normally backs you up one step from where you are. In other words, Power-base is as goof proof as possible. If you make a mistake, you can back up. If you are done, one key tells the machine you've finished. For each level of the program, the same keys perform the same functions.

Power-base also comes with a full tutorial that takes you from a to z. The tutorial is too long for me. I finally gave up trying to get through it all. However, it covers the entire spectrum of running this program, from loading a disk to creating a report.

To further assist the developing programmer, three sample applications are provided in addition to the tutorial. These applications defy the logic that all sample programs must be a name and address file and a checkbook program. They include an electronic phone directory, a stock tracking system and a project management system. The applications give you a good idea of how to use Power-base and excellent samples of how to set up files and establish relations, or zoom-links, as they're called in Power-base.

Creating a file in Power-base is much the same as creating a file in Dataease and other screen-driven database managers. The program gives you a blank screen, and you type onto that screen field names and identifying characteristics about the field. The filename must be an eight-character sequence that

conforms to standard DOS file naming protocol. Field names are picked up from the screen automatically, truncated to eight characters. Fields and prompts may be shown in reverse video or highlighted in addition to normal video. Field types include alphanumeric, date, money, numeric and logical.

Once a file is created, data entry is a fill-in-the-blanks effort. The cursor keys can be used to move you about the screen. As data is entered, it's checked against the edit requirements you've placed in the program. If a field must take only certain types of information, limited editing of the data entry process is possible.

Getting data out of Power-base is somewhat limited. The program supports columnar reports but won't permit creation of mailing labels or form letters. Numeric fields may be totaled during the reporting phase. A single sort field may be selected for either ascending or descending sorts while the report is being printed. Only indexed fields may be selected as sort fields. This is somewhat restricting since I often like to sort on two fields when creating a report. For example, all activities sorted by activity by day require two sorts, one by day and one by activity.

Headers may be designated for reports but not footers. Again, the possible selections are limited. What you should see developing here is proof of the statement that power and flexibility are tradeoffs for simplicity and ease of use. Power-base is an easy to use, forgiving program with a lot of nice features. But it trades its ease of use for some flexibility. Every choice you add to a program adds to the complexity of writing and maintaining it and adds to the problems associated with using it. Power-base's tradeoffs are mostly found here, in the reports section.

### Zoom-link

The Power-base relations are established with the Zoom-link feature. This is the Power-base term for relation. Establishing zoom-links requires no knowledge of relations or relational filing techniques. You select the Zoom-link option from the menu, place the cursor on the field you wish to zoom from, and name the target file and target field you wish to zoom to. Press the done key and the zoom-link is established. Multiple zoom-links can be defined (up to 64 per file) and up to ten levels of zooming can be declared. Two things make zoom-link work. First, it's easy to establish and use. Second, it sounds innocuous so people aren't afraid to try it. You and I know that it's really a relational filing technique, but we don't need to tell everyone else.

When you first start up Power-base, the program goes through a series of integrity checks on the files it's using. It looks for consistency between origin and target files for zooms and verifies that lookups and functions called by the file in use exist on the same disk. Calculated fields are checked to make sure the fields required to do the calculations are all available. This series of checks is another way in which GMS has designed Power-base to be goof proof. If you have introduced an error condition into your filing system, Power-base tries very hard to detect the error and reduce the adverse effect it can have on your files.

The Power-base documentation is done well. The tutorial is written in two levels: one for novices and one for advanced users. The tutorials require 210 pages. The reference guide is another 130 pages and is liberally illustrated with command trees and helpful hints. The important points are often found in the margins in heavy type. The appendix covers the technical points well. It keeps them away from the main text of the documentation where a novice might stumble onto them and become bewildered.

### Bottom Line

How does Power-base stack up?

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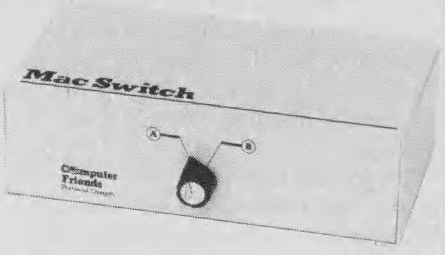
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Quite well. For the price, it offers a well-written, thoroughly debugged program that a novice will use comfortably. The documentation is better than most database management programs. The only criticisms I have to offer are directed at the limited sorting and reporting capabilities and the fact that the program is copy protected. I also got tired of disk swapping. The program resides on two disks and it seems as if you're constantly going from one disk to another. The copy protection scheme means that you'll always have to use the program disk to start the program even if you have a hard disk drive, a real disadvantage.

These criticisms are outweighed by the friendly and easy-going nature of this program. If the capabilities of Power-base are up to the task you have in mind, it's worth buying. You'll be more comfortable with this program in a short time than with most others you could purchase.

## Software Automation Fires Salvo

I mentioned Salvo last month and hoped to be able to have a fairly good look at it for this column. Unfortunately, some problems were found in the original version and a new version has been shipped. I received it in time to make a few observations, but a final review isn't ready. I've seen enough to be impressed.

The command language generator really does work. The command language isn't as well-documented as I would like. Setting up written reports isn't well-explained. The graphic file representations are excellent. Salvo gives you a graphic representation of the file you're using and the files that are related to it. You then select the type of report you wish to create from the files shown on the screen. Salvo also makes good use of a color screen if you own one.

Salvo's data entry screens are a little awkward to work with at first, but it doesn't take long to get used to them. Salvo isn't a screen-oriented database manager. Fields are defined in one part of the program; data entry is handled in another. The data entry screens wrap if there isn't enough room on one line of the screen for the fields. The field names appear at the top of the screen but scroll off the screen as data is entered. It's easy to be confused as to where you are during data entry. Enough said this month. I'll have a better idea of how well this fourth generation program works next month.

## New Construction On the PC

Information Builders Inc., (IBI), may not be a household name yet, but I attended a traveling road show demonstrating its new product, PC-Focus, and have to admit I was impressed. PC-Focus is the baby brother of Focus, the mainframe database manager distributed by IBI.

PC-Focus is a down-sized version of the original with a few bells and whistles on it not yet available on the mainframe version. The program comes to you on 11 (yes, 11) floppy disks. After all, the same program is loaded to your big mainframe on reels of tape. Anyway, after you load all 11 floppies to your fixed disk (you do have to have one of those, too), you're about ready to go. Of course, you also have to have enough memory (over 500KB is nice).

What this package brings to the PC is a program that's a mirror image of its big brother. File structure is the same. Mainframe files can be downloaded to your PC and used as is. When you're done, just put the data back. The mainframe won't know the difference between your files and its own. It also looks easy to use.

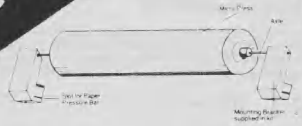
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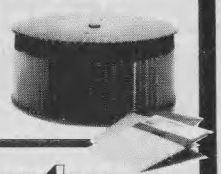
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PC-Focus has a program called Table Talk that's so simple to use almost anyone can be productive in no time. Table Talk uses windows to prompt you for the appropriate actions. As you respond to the prompts, you can see the actual command file being created. It's a slick way to handle the creation of command files. Table Talk is available only on the PC but is being ported to the mainframes. How about that for a switch?

On a serious note, PC-Focus may be the best possible program for people who keep one foot in the mainframe world and one foot in the micro world. It allows completely transparent moves from mainframe filing system to micro and back again. IBI is working on a 3270 communications package that will fit in with PC-Focus to make the PC look like a terminal on the mainframe, speeding up data transfer even more. This is one product the corporate market should watch for and examine closely.

## Coming Attractions

I just received a copy of Nutshell, programmed by Nashoba Systems and distributed by Leading Edge Products Inc. It looks like a nice combination of power and ease of use. Several key features include unlimited field length and the ability to parse long narratives for key words and then search on those keys. I'll take a look at this program next month in more detail. Also next month Salvo, VersaForm, Metafile and RL-1 will get some attention.

I'll also take a look at an add-on for dBase II that permits the creation of arrays. Stay with us for more news, views and reviews.□

*GMS Systems and Software Solutions have just announced updated versions of Powerbase and Dataease, respectively. The companies claim the revisions solve the problems that I pointed out here. Stay tuned for follow-up reviews. S.B.*

*Address correspondence to Shawn Bryan, Datatek, Montpelier Junction, Box 4500, Montpelier, VT 05602. Contact Shawn on The Source: BBP681; CompuServe: 71535, 1774; or MCI Mail: SBRYAN.*

Programs mentioned:

Power-base
PowerBase Systems Inc.
12 West 37th St.
New York, NY 10018

PC-Focus
Information Builders Inc.
1250 Broadway
New York, NY 10001

Dataease
Software Solutions Inc.
305 Bic Drive
Milford, CT 06460

Salvo
Software Automation Inc.
14333 Proton Road
Dallas, TX 75234

Teach Yourself dBase II
American Training International
12638 Beatrice St.
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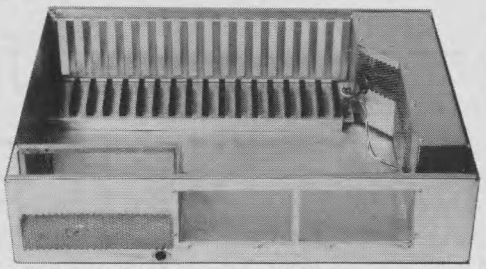
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# The Unix Pipeline

By Phil Hughes

## The Unix Shell Game

### Pipes and Wild Cards Demystified

In my last column I talked about the history of Unix and demonstrated how to use the pr command. This month I'll explain what the shell is and show some of its basic capabilities. I'll also explain the use of the cat command. Even if you're a proficient Unix user, you may find some ideas here that are new and useful. Please read on—I learned some things while writing the column. Again, I'd like to encourage you to send me questions you have about Unix or any subjects you'd like addressed in future columns.

---

### The Unix Shell

The shell is a sophisticated program that is your interface to the Unix operating system. It offers numerous capabilities, including built-in commands, scripts (or functions) with positional parameter substitution and conditional execution. I'll only address the basic capabilities of the shell, the ones that you're most likely to use. If you're interested, I'll talk about the more sophisticated shell capabilities in a later column.

In its simplest form, the shell is a command interpreter. As soon as you log into the system, the shell is activated, and you must enter a command. The shell collects the characters that you input from your terminal until you enter an end-of-line character (generally a return). When the shell receives the input line, it breaks it up into logical chunks and takes the appropriate action.

The first of these logical chunks is called the command. The remaining chunks are called arguments. Generally, the action consists of locating and loading the program identified by the command and then passing it the arguments from the input line.

Let's look at an example based on the pr command that I discussed last month. To get pr to print the file mine, you entered the following command:

```
pr mine
```

What the shell does is to break this command line into two pieces (pr and mine), locate and load the program named in the first piece (pr) and pass the second piece (mine) to that program. At this point, the program pr is in control and the shell waits for pr to complete its work.

Four Unix buzzwords are associated with this action. A *process* is a program that is known to the operating system because it's in the process table. These processes are created by the *fork* system request. The newly created process is called the *child* and the creator is called the *parent* process.

Now, using these new buzzwords, here is what happened. The shell forked a new process, executed the file pr, passing it the command line arguments, and waited for the child to complete. When it completed, control was returned to the waiting parent process (the shell).

Up to this point, this is pretty much what any operating system does when you enter a command. If it seems more complicated, it's probably because you've just accepted what the system does and never thought about it. The reason you need to understand it here is that the other capabilities of the shell are built upon this base.

#### I/O Redirection

The next capability of the shell I'll

discuss is called I/O redirection. This lets you change where program input comes from and output goes to on the command line. In order to understand this, three more buzzwords must be explained: *standard input*, *standard output* and *standard error*. These three files are automatically set up when a process is created. Standard input, usually referred to as stdin, is normally associated with your terminal keyboard. Standard output (stdout) and standard error (stderr) are normally associated with your CRT screen or hard copy output of your terminal. A program can then access these three files in order to communicate with you.

If you want to run a program and tell it to send its output to someplace other than your terminal, you can do this by redirecting the appropriate file. The program that's running is generally not aware that the output has been redirected. I say generally because the program can determine if a file is connected to a terminal, but unless it specifically cares, then it needn't even check. The system treats all files the same, a terminal being a special kind of file.

For example, you might want to run pr and send its output to the file output. Pr sends its output to stdout so what you'd have to do is to redirect stdout to the file output. The operator to redirect output is the greater than sign (>), so you enter the following command:

```
pr mine >output
```

The result is that the shell recognizes the > and reassociates stdout with the file output prior to executing pr. If output exists, it is cleared; otherwise, it's created by the shell. When pr runs, it's only passed the one argument (mine) and it sends its output to stdout. Thus the association of stdout with the file output is not important to the program pr.

The same concepts apply to the other two files, stdin and stderr. To redirect stderr to a file the operator 2> is used. (This is actually a special case of output redirection. The number 2 is the file descriptor number for stderr.) Redirecting stdin is much the same except this is a file from which a program can receive its input. The operator to use is the less than sign (<).

Many more input/output redirection options exist and they are all listed in Table 1. The only other one I plan to discuss is the append operator, >>. The append operator works the same as the output redirection operator if the specified file doesn't exist. If the specified file does exist, then it's opened and positioned at the current end of file. Thus, when the program runs, its output is appended to the current data in the file.

For example, let's say you run pr as in the previous example, creating output, and then realize that you want to also have the result of processing the file ours with pr in the file output. The first idea that comes to mind is to rerun pr on both files with the following command:

```
pr mine ours >output
```

This would certainly work, but if the file mine is of any reasonable size, it wastes computer time because the pr program has to reprocess all the data in the file. The alternative is to use the append operator to add the results of processing ours with pr to the file output. The following command accomplishes this:

```
pr ours >>output
```

Before I move on to the next subject, I want to make one comment. Remember that the shell handles the redirection operators before the arguments are passed to the program. Therefore, the location of the redirection information in the command line has no effect. For example, the following three commands are equivalent:

```
pr mine >output ours
pr mine ours >output
pr >output mine ours
```

Just remember that the first word must be the command to be executed.

### Pipes

The next capability of the shell that I want to talk about is called the pipe. A pipe connects the standard output of one program to the standard input of another program. The vertical bar (|) is used to represent a pipe. In function, I/O redirection can be used to accomplish the same thing but requires more steps on your part and probably uses more computer resources.

For example, let's say you want to (1) run the Who program to determine who is on the computer system and (2) add the header that pr provides. This will show the date and time that you performed the Who. You can do this in two steps as follows:

```
who >tmp
pr >tmp
```

The first step causes Who to run and sends its output to the file tmp. The second step executes pr telling it to get its input from the file tmp. Thus the output of Who is processed by pr, and the result will probably look something like this:

```
Dec 23  13:44  1983  Page 1
kenneth  tty0  Dec 23 09:15
fyl      tty1  Dec 23 11:34
irene    tty2  Dec 23 13:22
games    tty5  Dec 23 13:31
```

This accomplishes the task but has a few side effects. The most significant one is that the file tmp is left when you're done. If you do this a lot of times with different temporary filenames, you'll have a lot of files to clean out of your directory. The other side effect is that you have to type in a lot of information that has nothing to do with the task you plan to accomplish. The original goal is to process the output of Who with pr. This is exactly what the pipe is designed for: to pipe the output of one process into the input of another. In the example above, the following command accomplishes the same task without the side effects.

```
Who  pr
```

This pipes the output of Who directly into the input of pr without creating any intermediate files. Although I've only shown a two-stage pipe (or pipeline), it's possible to have any number of pipes on one command line.

### Wild Cards

The third shell feature that I'll introduce is using metacharacters in filenames. Metacharacters give you the ability to ask the shell to find a file whose name matches a specified

| | |
|---|---|
| <*file* | use *file* as **stdin** |
| >*file* | use *file* as **stdout** |
| >>*file* | like > but append to *file* |
| <&*n* | duplicate input file descriptor from *n* (**stdin** default) |
| >&*n* | duplicate output file descriptor from *n* (**stdout** default) |
| <&- | close **stdin** |
| >&- | close **stdout** |
| <<*arg* | treat line with *arg* as an end-of-file on input |
| <<-*arg* | as above but ignore leading tab characters |

*Table 1. This table shows all the possible redirection operators for the Unix System III shell. All operators may be preceded by an optional file descriptor. Defaults are in parentheses.*

pattern rather than a specific name. This usually results in the generation of multiple filenames from one specified pattern, a capability that saves you a lot of input.

Five special characters are associated with the wild-card-naming convention. The first two special characters are an asterisk and a question mark (* and ?). An asterisk matches any string of zero or more characters. A question mark matches any single character. For example, if you want to reference all files whose names start with framus, you can use the following match strings:

```
framus*
```

This string matches framuses and framustat as well as framus. If you want to match all files whose names have zap anywhere in them, you can use the following match string:

```
*zap*
```

A question mark is used if you have a more specific match in mind. For example, if you want to match all files whose names are four characters and the first three are sec, you use the following match string:

```
sec?
```

The other three special characters are used to specify a list of allowable match characters. These special characters are left brace, right brace and hyphen ([ ]-). The left brace introduces the group of match characters, the right brace terminates the group and the hyphen is used to indicate a character range.

For example, if you want to specify the filenames chap1, chap2 and chap5 you can use the argument:

```
chap[125]
```

If the names you want to generate are sequential, then you can use the hyphen to specify a range of names. For example, if you want to access chap1 through chap6 and chap9, you can use the following argument:

```
chap[1–69]
```

Note that this feature only matches one character. If you have your chapters numbered chap01 through chap29, you'll have to specify the wild card name as:

```
chap[0–2][0–9]
```

If you're not sure what filenames will be generated as a result of using wild cards, you can check them with the Echo command. Echo just displays its arguments on standard output. By entering Echo followed by the wild card filename, you'll get a preview of what will be sent to the program that you intended to use. If all is well, then you can reenter the same wild card argument to the desired program.

### Quoting

You may wish to use a special character, such as an asterisk, without it causing the filename to be expanded into any matching names. There are three ways to do this. First is the use of the backslash (\). The backslash tells the shell to treat the following character as a normal character. For example, the following command will print files whose names end with an asterisk:

```
pr *\*
```

The shell can be told to treat an argument literally by surrounding an argument with a set of single quotes. For example, if you wanted to print the file named ab***c, you can use the following command:

```
pr 'ab***c'
```

The double quote character (") can be used in the same way as the

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single quote in this situation. Double quote protects the special characters from wild card expansion but allows the shell to perform parameter and command substitutions, a whole column on its own.

## CAT—Concatenate and Print Files

The cat utility program is one of the simpler Unix utilities and the one that is probably used the most. Table 2 shows a summary of the cat command. Cat reads each input file in the order it is specified on the command line and writes the information read to standard output.

The most common usage is to simply list a file back to the terminal. For example, to display the contents of the file mystuff on the terminal, you'll enter:

```
cat mystuff.
```

If you want to display multiple files, then their names can be listed on the command line and cat will just display one after the other. By redirecting the output, it's possible to stick the contents of many files into one file. This process is called concatenation, thus the name cat for the program. For example, if you want to create a new file, named new, that contains all the information from files old1 and old2, you can enter the following command:

```
cat old1 old2 >new
```

or using wildcards:

```
cat old[12]>new
```

One other common use for cat is to create a simple file. Using cat eliminates the need to enter one of the editors, saving time. For example, if you want to create a file named test and enter into it the following two lines:

```
This is the first line of data.
This is the other line.
```

you can easily do this by entering the following sequence, where ^D represents a control-D.

```
cat >test
This is the first line of data.
This is the other line.
^D
```

If cat doesn't get any arguments, then it assumes that you're entering its input from the keyboard. Also, if you want to enter input from the keyboard as well as other data from a file, you can use a hyphen (-) as the argument where you want keyboard input to be used. For example, if you have a data file and you need to add some header information to the beginning of it, you can use this feature of cat. Let's say the data file is named mydata and you want to precede the data with a line that contains the words: data follows. You can do this with the following command:

```
cat - mydata
data follows
^D
```

Remember, you won't receive a system prompt when it's waiting for you to enter data follows. This input goes to the cat program, not the shell, and cat doesn't prompt for input.

Well, this is all I have for this month. Next month I'll talk about the Unix file system, show you how to get around in the hierarchy and describe the use of the ls, pwd and cd commands.□

*Address correspondence to Phil Hughes, Specialized Systems Consultants, PO Box 7, Northgate Station, Seattle, WA 98125-0007.*

**CAT**—Concatenate and Print Files
% **cat** [*options*] [*files*]
**stdin** read if — or no *files* specified
Options:

| | |
|---|---|
| **-s** | silent about nonexistent files |
| **-u** | unbuffered |

**Conventions:**

A % represents the system prompt
**Bold face** represents items that must be typed as they appear.
*Italics* represent items that are to be substituted for.
Brackets [ ] surround items that are optional.

*Table 2. The Unix Concatenate command (cat).*

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# Connect Time

By Chris Crocker

# The Telecommunications Explosion

## Bulletin Boards: A New Way Of Talking?

Telecommunications is one of the more complex subjects in microcomputing, not only because of the incredible breadth of the field and its potential, but also because it's so new to so many people.

What was once an activity enjoyed only by a few is now one of the industry's fastest growing areas, and the surface has hardly been scratched. I don't think it's necessary to go into a long, dreamy discussion of the future for the on-line world and the fantastic possibilities ahead; just use your imagination.

### Embarrassing Moments

The first time I ever went on-line I was reminded of my first time on CB radio. It was right in the middle of the CB craze. I finally managed to figure out how to set the switches on my radio, attached my antenna to the roof and went out on the road.

I tuned in to Channel 19 and listened for a while, getting my nerve up. I thought of what I wanted to say. Finally, I was ready. I pressed down the button and blurted out the ubiquitous "Breaker one-nine." After a short silence, I received a response so filled with numbers and unfamiliar expressions that I had to turn off the CB—to hide my embarrassment at not knowing how to respond. My CB repertoire stretched no further than the lyrics to the song "Convoy."

It wasn't all that different the first time that I tried telecommunicating with a computer. I was researching an article where I had to locate an errant programmer who was responsible for a minor private labeling scandal. Someone suggested that I leave a message on one of the on-line bulletin boards. A friend helped me set up the configuration program and hook up the modem, and then, after wading through a series of menus, I found myself in the bulletin board.

The on-line editor had a name reminiscent of a holding tank on a ship, and for a full hour I wrestled with it, trying to compose my simple message. Finally, frustrated, I had to hang up the phone, without ever posting the message.

I never went back to CB radio, but telecommunications is a different story.

It's been a while since my first brief encounter with that bulletin board system, and since then I've dealt with seemingly impossible frustrations in person-to-person link-ups, RS-232C wirings, serial protocols and on-line services. If I had a nickel for every time I've read or heard something I didn't understand, I could buy my own Cray supercomputer.

Still, personal computer telecommunications has come a long, long way since that time, only a few years ago—and it has a long way to go. Now, tens of thousands of people are jamming telephone lines, calling bulletin boards and information services, conversing via computer as though speaking is a thing of the past, as though longhand has gone the way of Sanskrit, and as though faceless, voiceless conversation is almost preferable to meeting face-to-face.

### New Horizons

On to what it's really all about. I can correspond with a long lost friend on the West Coast by making an in-state telephone call; I can post a message to a client, first thing in

the morning Eastern Standard Time, and know that she will see it first thing in *her* morning, too. I can avoid the crowds at the shopping mall during the holidays and order all of my gifts (and gadgets) through my computer. I can avoid at least some of the uncertainty of the postal service; I can even distribute a news release or a note to hundreds of people—simultaneously—without ever leaving my desk. Best of all, I can make a living at home, if I want.

That's just a little bit of it. I could go on for hours. But what all of this means is that I now expect a whole lot more from my computer, my telecommunications software, my modem, the telephone company and the service I'm calling. What was once a hobby for people who just had to become experts and who enjoyed speaking a language only they understood is now a multibillion dollar industry linking together children, adults, homemakers, professionals . . . virtually every interest group. Let's face it—my mother could be a telecommuter.

There's simply no rational reason in the world for telecommunications to be complicated any more. Information utilities should use plain English commands and prompts; manufacturers should follow the RS-232C standards; everything should be cheaper and easier to use; and, most importantly, all information utilities should have an access node locally accessible to towns like Peterborough. I mean, really.

Realistically, though, things are coming along. The major information utilities have vastly improved their manuals and dropped their prime-time rates. I recently managed to swap modems without having to rewire a serial cable. I logged on to a bulletin board that didn't confuse or insult me, and I even learned a way to save a buck on my skyrocketing phone bills by buying a special in-state long-distance service from my local telephone company. (Since Peterborough only has pulse dialing, I use an autodial modem to dial pulse to the nearest MCI number, halfway across New Hampshire, and then switch to true tone to dial the access number and the number I want to call).

### Up from Here

So where do we go from here? I think that there's no way to go but up. I'd like to see some stronger competition from the up-and-coming information utilities; I'd like to have more free bulletin board systems stick around longer; and I'd like to have someone else pay my phone bills.

Where does this column go from here? I'll be discussing virtually everything pertaining to telecommunications, keeping you abreast of what's happening on the major (and not so major) information utilities; financial services; bibliographic and full-text databases; free and paid bulletin board systems (BBS); the latest in equipment; what the telephone companies are up to; and much more. I'll be discussing ways of saving money, as well as some ways to make money on-line, and I'll provide help along the way for getting the most out of your communications.

Most importantly, though, I'll be keeping an open line with readers. If you'd like to see more—or less—information about something, or if you have something to add, please let me know. It's like any good bulletin board system—it gets better the more people add to it. For now, you'll have to write or leave me a message on CompuServe: 70116, 752; The Source: BBW440; or Delphi: MICROCOMP. We may be able to work out our own BBS for reader response later.

Next month, I'll be looking into electronic mail, including CompuServe, SourceMail, MCI Mail, EasyLink, Delphi Mail and ECOM. I'll be checking them all out and will have some tips on best bets for the electronic

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mail, as well as some pointers on using the various services.

Until then, keep in touch. Maybe we'll get together over lunch. Have your computer call my computer to make an appointment. . . □

*Address correspondence to Chris Crocker, 510 Windy Row, Peterborough, NH 03458, or contact him on CompuServe: 70116,752; The Source: BBW440; or Delphi: MICROCOMP.*

## BULLETIN BOARDS VISITED

**TITLE:** Boston Information Exchange (BINEX)
**LOCATION:** Boston, MA
**PHONE:** 617-423-6985
**PARAMETERS:** eight-bit word length, one stop bit, no parity
**SPEED:** 300/1200 bps

This is an RCP/M bulletin board system, meaning that it's a CP/M-based bulletin board system with downloadable software for CP/M systems. M-Tree is a family-tree-like message system through which you trace messages through the main (parent) message, down through the next set of additions and comments, and further on (grandchildren, and so on) to subsequent messages.

Get yourself an autodialer for this system. It's extremely busy. So busy, in fact, that charging a minor fee to use it and then adding extra phone lines are both being considered. RCP/M systems mainly benefit CP/M users, so it may not be worth your while to make the call to this one unless you have CP/M. This system also uses a quiz to determine if you understand CP/M well enough to enter its operating system area, which isn't for beginners by any means.

**TITLE:** Old Colorado City Electronic Cottage
**LOCATION:** Colorado Springs, CO
**PHONE:** 303-632-3391
**PARAMETERS:** eight-bit word length, one stop bit, no parity
**SPEED:** 300 bps

This BBS is a bit off the wall but fascinating for anyone who enjoys open discussions ranging from computers and telecommunications to political debates.

When I called, an open discussion of the Gary Hart campaign was going on. The various menu options follow a Western motif (the mail option is called the Post Office and to sign off the system is to Skip Town), which may sound hokey, but it really is kind of a refreshing change of pace. The system also offers downloadable programs and text files. This is an active and lively BBS—well worth the call.

**TITLE:** The Notebook
**LOCATION:** West Palm Beach, FL
**PHONE:** 305-686-4862
**PARAMETERS:** eight-bit word length, one stop bit, no parity
**SPEED:** 300 bps

This bulletin board system is geared toward writers and publishing people. Its messages and text files mostly concern issues of interest to freelance and full-time writers. Many of the messages involve calls for articles and manuscripts for various publications, including computer magazines.

The Notebook is extremely friendly and I found it easy to use. I recommend it highly for anyone interested in writing.

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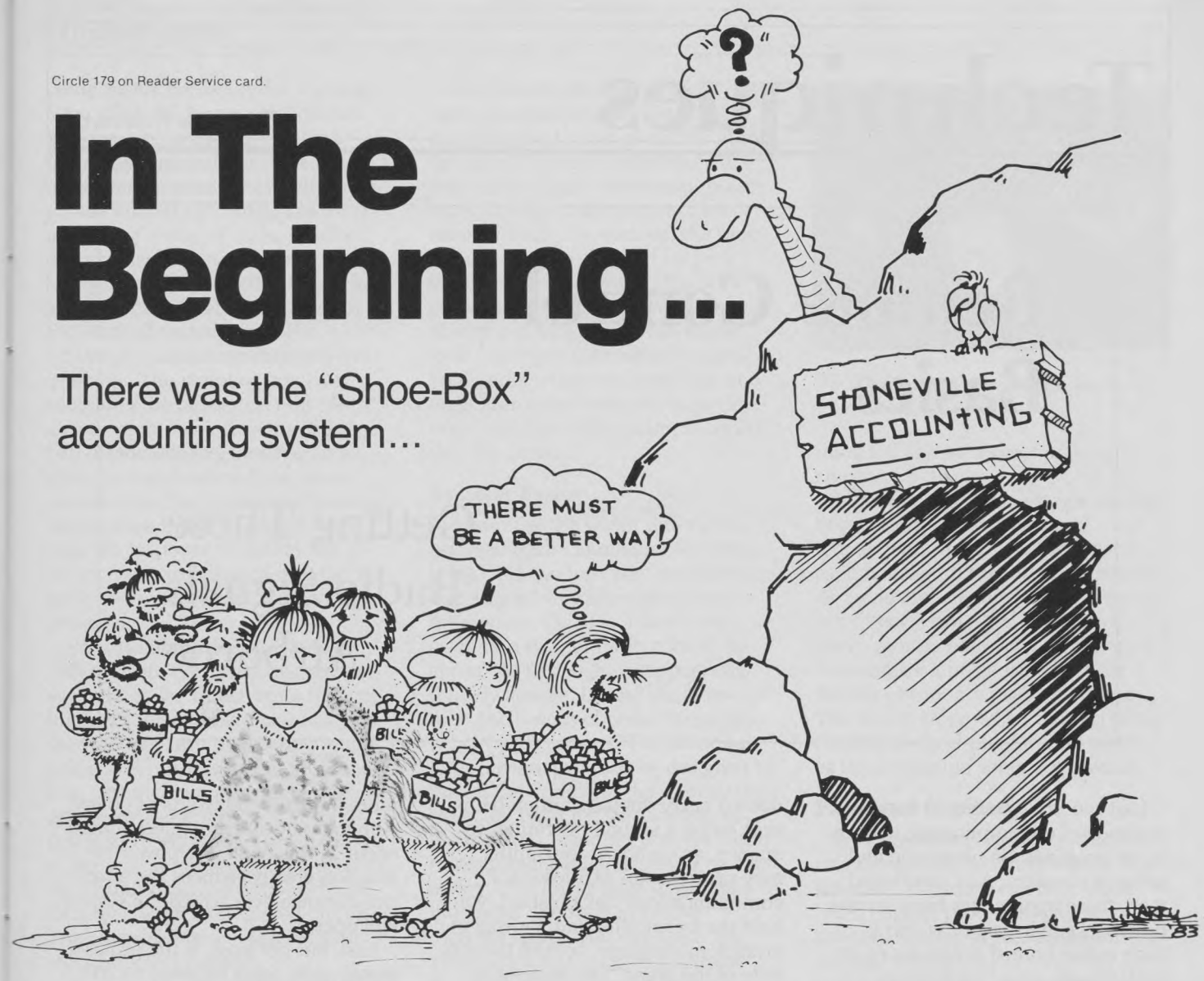
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# Techniques

By Mark Robillard

# Remote Control Basics

## Getting Those Radio Signals Airborne

Last month, I presented various methods of communicating with remote machines via ultrasonic and infrared circuitry. As I mentioned then, these approaches have several drawbacks, the least of which is their rather limited range. As promised, this month's "Techniques" delves into the use of modulated radio waves as an alternate communication method. You'll find that using radio eliminates most of the disadvantages of earlier methods and enhances your control over remote machines as well as extending your reach.

### Radio Methods

Most of you are familiar with the existence of remotely controlled radio airplanes. For years, these models have buzzed around shopping center parking lots during nonshopping hours. Any time you enter a local hobby shop, a display of hanging aircraft can't help but catch your attention, if not the top of your head! Each of these models must contain at least two things to qualify as radio controlled (RC): a receiver and a transmitter.

Obviously, the aircraft itself doesn't carry the transmitter. (However, using a second operating frequency, an on-board transmitter may prove useful as a feedback communications link.) Instead, you hold the transmitter and, by way of joystick movements, control the attitude of the plane. The receiver in the model sends electrical signals to servo motors that physically move the various control surfaces on the aircraft's wings.

Speaking of frequencies, the frequency bands available for use with radio-controlled models are limited. The Federal Communications Commission has allocated frequencies in three bands for experimental radio control. The first band is from 26.995 to 27.255 MHz. Any CBers out there might recognize those numbers. CB radios and most of the inexpensive walkie-talkie products on the market share these frequencies. Any radio-controlled circuit relying on this band has to be designed to ignore the many false signals it may receive due to the heavy voice traffic.

The second band hovers around the 49 MHz area. Legal use of this band limits transmitter output to no more than 100 milliwatts of power. Although few outside interferences occur in this band, the power restriction greatly reduces the effective distance over which the system will operate.

Last, but not least, is the professional radio band between 51.200 and 53.500 MHz. To operate in this range, an FCC-approved amateur radio license is required. You'll see very few commercially available systems designed to operate in this range. One other range lies between 72.160 and 75.640 MHz. This area is earmarked strictly for experimental radio control use.

### Transmitter Basics

With knowledge of the available frequency bands under our belt, let's investigate the basics of getting a control signal into the air. As you may know, producing the operating frequency for a transmitter requires an oscillator that provides what's called the carrier frequency. If you choose to operate your RC system at 49.86 MHz, the oscillator must be designed to produce a carrier wave at this frequency.

Fig. 1 illustrates the very minimal

components necessary for the operation of an RC transmitter. Notice that the carrier oscillator is controlled by a modulator. Last month's ultrasonic transmitter circuits were pulsed on and off during the transmission of a digital code. In effect, this enable/disable cycle was modulating the ultrasonic 40 kHz carrier. You must modulate the carrier of a radio-based system similarly.

Several modulation methods are available. The simplest involves switching the carrier on and off to denote each pulse. This method has two disadvantages, however: it's prone to interference from other transmitters that might be operating in the same frequency band. Second, the response time that the receiver needs to acknowledge the signal is too great for the method to be practical.

Because of these disadvantages, radio system designers devised other methods for transferring information over the carrier. The most popular methods are pulse code modulation and pulse width modulation. The first involves a series of carrier/no carrier bursts in a specific predefined sequence. This method is reminiscent of the coding used in the output of asynchronous digital data by a UART integrated circuit. The response time of the receiver still limits this method.

Pulse width modulation (PWM) is widely used today in the more expensive digital proportional RC systems. This method frequently borrows from pulse code modulation in that a start pulse of some kind and an ending pulse are transmitted. A representation of the output of a typical PWM transmitter is shown in Fig. 2.

As you can see, the carrier is once again controlled in an on/off manner. The short burst of carrier at the far left of the figure represents the start pulse. Eight subsequent pulses carry channel information. This number really depends on the number of channels serviced by your transmitter. The longer stop burst comes last. Its waveform resembles that of a UART. However, if you look closely at the channel bursts, you'll notice that channels two and eight aren't the same width as the other six. The information is coded into the pulses.

### Receiver Basics

Assuming the width differences between each channel mean something, let's see how the receiver can be designed to make use of these differences. Fig. 3 is a block diagram of a typical radio control receiver. At first sight, it appears extremely simple. In real life, however, the design of radio frequency (rf) circuits is an art. The demodulator obviously has to be designed to match the coding of the information expected from the transmitter. In the previous example, a pulse width measurement scheme would be necessary. The lower portion of Fig. 3 illustrates one such example.

In the figure, you can see a discriminator that outputs a narrow pulse on each edge of a carrier burst. These pulses could be applied as gate-control signals to free-running counters. A circuit could be designed that would selectively, depending on the number of pulses, gate the counting of eight individual counter/timers. A microprocessor could then interrogate the holding register of these counters to determine the absolute value of each channel width.

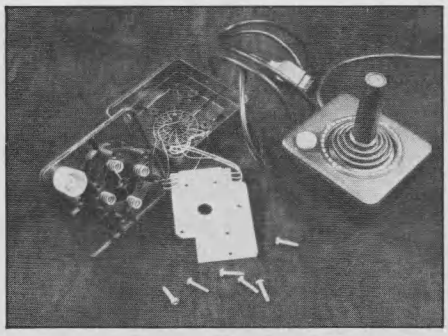


*Photo 1. Standard Atari joystick components.*

In actuality, PWM systems are seldom used in as sophisticated a system as that. In fact, simple pulses, each usually on for the exact period its associated channel is on, are output directly from the RC receivers. Servo motors connected to circuitry that adjusts a pulse generator for a similar output are used extensively. The motor stops when the incoming control channel pulse width matches the adjustable generator's width.

### Purchased Solutions

As I mentioned earlier, radio circuit design can be complicated. Fortunately, a number of off-the-shelf radio control products may be adapted for use as remote communications systems. After spending several hours in local toy and hobby stores, I found several potential solutions. The first is the simple remote control race car.

Many brands of race cars are available, each with unique "functions." Models with only two functions move as soon as you turn on the switch. Keying the hand-held transmitter activates a relay in the

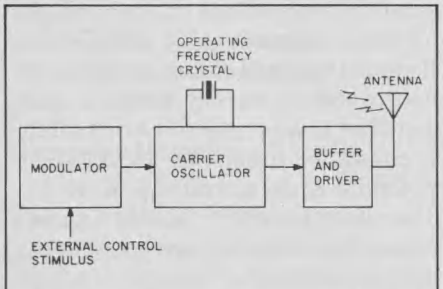



*Fig. 1. Functional block diagram of an rf transmitter.*

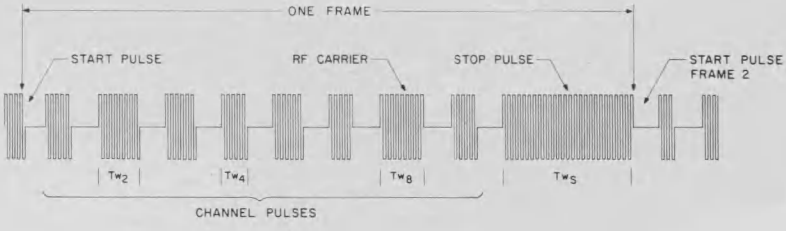



*Fig. 2. Representation of the output of a Pulse Width Modulated transmitter.*

car that reverses the battery voltage to the wheels. When you press the control button on the transmitter, you're actually making the negative battery connection to its circuit that, in effect, enables the carrier. This on/off control method yields a two-function car that goes forward and backward. Unfortunately, it doesn't include a stop function.

Systems with two buttons (dual transmitters) allow turning and speed (fast/slow) selection. In all, you can choose from several systems on the market. The big question is, can you use this circuitry to convey data to a remote machine?

Recall last month's problem with receiver lock-in time (the number of carrier frequency cycles required for a receiver to latch the output of a tone decoder). In this case, the receiver circuitry itself is designed to accept finger-pushing frequencies of possibly up to ten pulses per second. Remember also that many of these receivers incorporate relays as their output interface to the outside world. A relay's mechanical switch contacts have electrical bounce characteristics that render them unacceptable for use with sensitive digital code counting circuitry.

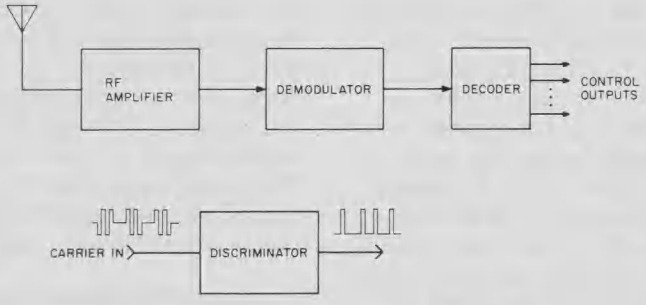



*Fig. 3. Basic functional diagram showing major components of an rf receiver with detail given to a discriminator output decoder.*

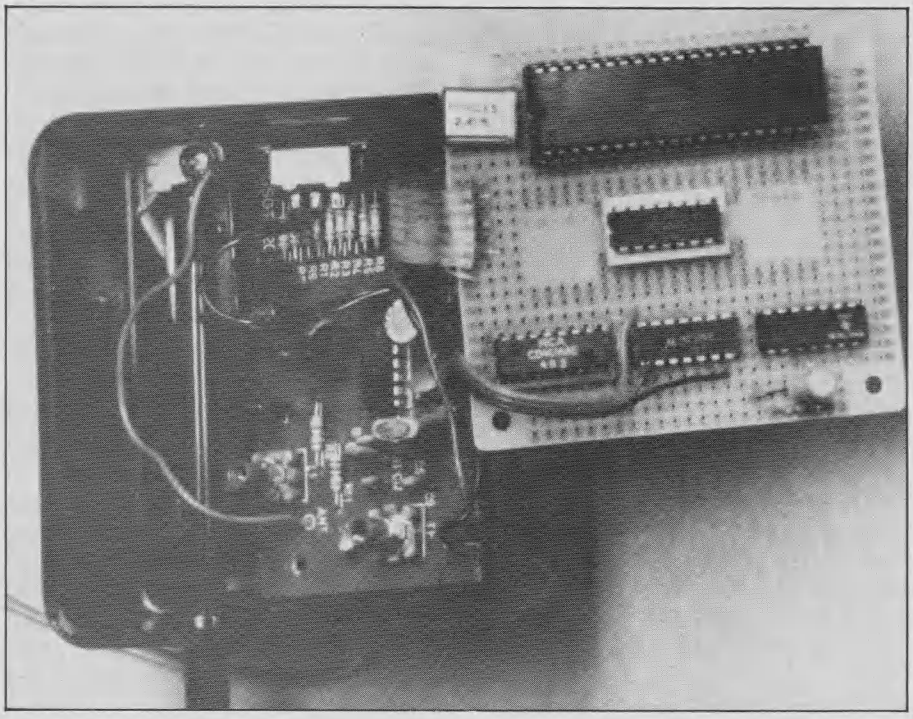


*Photo 2. Atari remote joystick receiver circuitry.*

That leaves us with only the more expensive digital proportional RC car systems. Upon further investigation, you'll find that the outputs from these systems are those variable width pulse trains that must be counted to be useful. Is there no other suitable radio control product available?

### Atari Joysticks

How many times while playing with your Atari 2600 have you noticed the amount of cabling that gets intertwined with the power cord and all those cartridges? Nothing is more frustrating than to be on a roll and suddenly lose your fire button because the connector was inadvertently pulled loose. Boy, could I use a remote-controlled Atari joystick!

One day while Christmas shopping, I spotted just the product I'd been looking for. Made by Atari, it operates like the pair of joysticks I already own except it has no wires. The base unit's power comes from the little transformer that normally powers the Atari, and its two nine-pin connectors plug in where the wired joysticks normally go. Each joystick unit is a rather fat version of the standard units, with a short, flexible antenna sticking out the side.

Unfortunately for the rest of my family, these new joysticks never made it to the Atari. On the way home from the store, it dawned on me that these could become the solution to my rf communications problem. After all, if they operate exactly like a switch-based joystick, then they must provide five debounced outputs. Let me explain.

The standard Atari joystick is composed of five momentary-contact switches that are mounted on a small PC card inside the case. Photo 1 shows a disassembled unit. Deflecting the plastic stick handle causes one or more of these switches to be pressed. Each switch is connected to provide a ground potential when activated (Fig. 4). The circuitry within the Atari game senses these low voltage levels and acts accordingly.

Through experimentation, I found that this product wasn't suitable for direct serial transmission. However,

the four direction outputs and the separate fire output gave me a tremendous idea.

### Radio ICs

Before I get into the particulars of the system, let me give you some brief background on the operation of the Atari remote joystick system. The transmitter and receiver use a pair of radio control ICs produced by National Semiconductor. The LM1871 transmitter is a self-contained unit that requires a minimum of external components. Its operation is similar to the one described earlier. It has the capability of transmitting up to six proportional channels. Each channel input is represented as a variable resistance connected to one pin of the transmitter IC. In the case of the Atari hook-up (Fig. 5), each channel is connected to the same fixed resistance value. This gives a uniform channel pulse width. You see, I'm not interested in providing proportional outputs at the receiver, just on/off values.

The standard joystick switch arrangement is still incorporated within the unit. However, as a switch is activated, it shorts out the resistance value connected to its particular channel, which will drastically change its pulse width. By sending out six channels, all four direction signals and the fire button may be implemented, with one channel to spare.

On the receiving end, the circuitry becomes increasingly more complex. Yes, they use the single chip companion to the transmitter (LM1872). However, a tremendous amount of other circuitry is there too. Realize that the receiver (shown without cover in Photo 2) is actually providing two separate five-channel outputs (one for each joystick). No modification is necessary to incorporate this unit unless you want to remove it from its case.

### Computer Interfacing

If you'll recall from last month, I had a tough time matching remote transmitters and receivers to the relatively high-speed bit rates of computer serial transmission. The Atari remote joystick is no exception. The transmitter chip is free running and, therefore, may not be totally synchronous with the bit times being presented to it. Therefore, a nine millisecond-wide data bit may turn out to be received as a three-millisecond pulse. (With manually controlled switches, as in the case of a joystick, this isn't a problem because more than one transmission will occur for each direction. The second and subsequent transmissions will adjust for the correct pulse width.)

If serial transmission is out, how can you achieve data transfer to a remote machine? How about parallel? It's actually faster in the long run. In fact, because the receiver doesn't have to be modified, parallel makes a good choice. Let's look at a scheme that provides command codes over a parallel link.

Fig. 6a shows the waveforms and signal timing information for a four-bit parallel data link with strobe

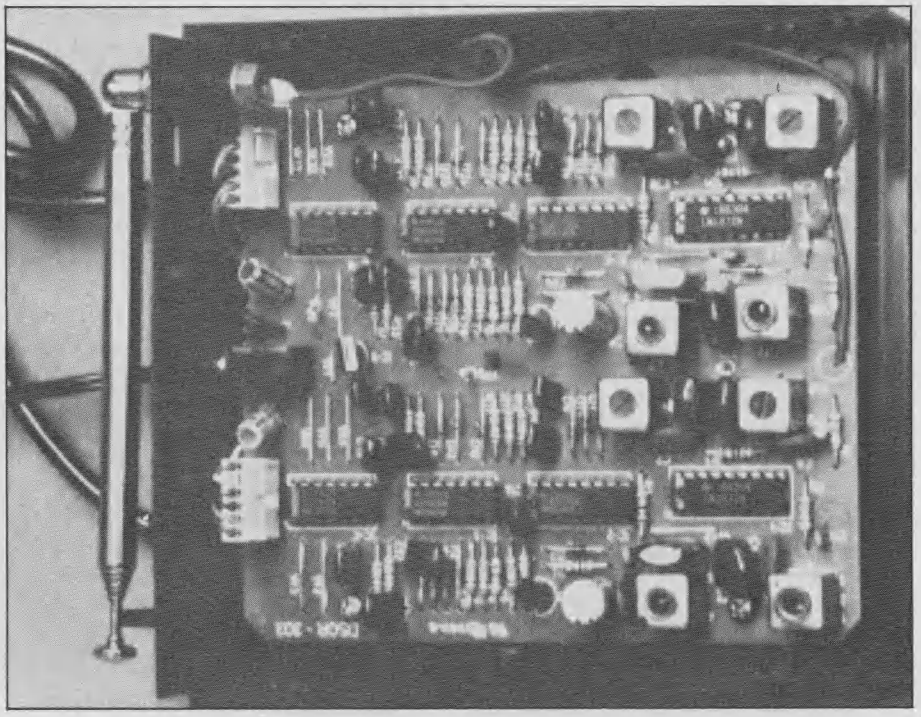


*Photo 3. Photo of complete joystick interface.*

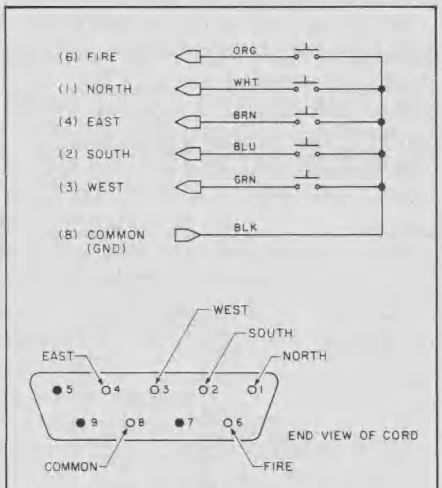



*Fig. 4. Standard Atari joystick schematic and pin connections.*

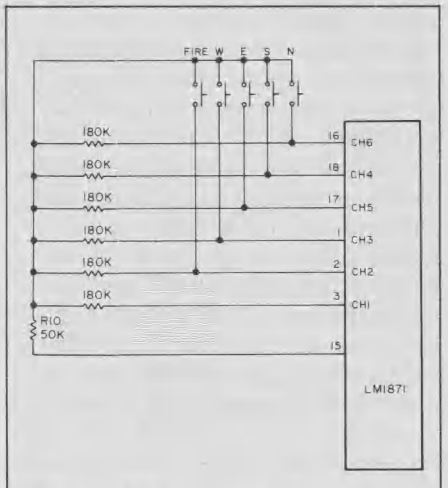



*Fig. 5. Partial schematic of the Atari remote joystick transmitter circuit.*

line. Beginning to get the idea? As you can see in the figure, a data byte is broken up into two four-bit nibbles. Each time a four-bit code is output, the strobe line is also lowered. To latch the data at the receiving end, the strobe line is raised preceding the loss of data. The circuitry you are interfacing with must provide the ability to either latch the data on the rising edge of strobe or input the stable data shortly after strobe goes low.

### Experimental Circuit

As you have undoubtedly surmised, the four direction signals that are provided at the joystick connector on the receiver will be used as the four-bit binary weighted data. The fire signal becomes the strobe. Simply hooking up the receiver in the fashion shown in Fig. 6b to a computer system is all the signal reception circuitry necessary.

At this point, let's see how you can automatically control the transmitter. Recall that the five mechanical switches are connected into the transmitter board. In fact, they're mounted in the cover of the unit and attach via a six-conductor ribbon cable. By removing the joystick switch assembly and replacing that six-conductor cable with a seven-conductor cable, you have the beginning of remote-remote control!

The trick now is to provide the electronic equivalent of a mechanical switch, that is, one that may be controlled by a computer. A relay would work; however, it introduces contact bounce that you'd really like to filter out as much as possible. The analog switch (CD 4016) is a good choice. A logic one applied to its control pin will connect its input and output pin together through fewer than 500 ohms. That would qualify as an appropriate switch for this application.

Four of these devices come in one package so you'll have to use a second just to get the strobe signal. As I mentioned, logic ones enable the outputs. Realize that an enabled output will present a logic low at the receiving end, so invert your data accordingly.

As long as you're content to use a parallel output to interface to the joystick, this is as far as you've got to go. However, for those of you with serial ports only, read on.

Fig. 7 is a complete schematic of a serial-interfaced joystick controller. The device used is a CMOS UART with a built-in bit rate generator. It is set up to receive data at 9600 bits per second with eight-bit character length, even parity and two stop bits. Unfortunately, it requires an external +5V power source that may be hard to derive from an RS-232C interface. If you just use the parallel connection, simply hook up your data at the point in the schematic where the UART outputs feed the analog switches. Photo 3 shows the completed circuit mounted into the joystick housing.

### Conclusion

Over these last three months, I've presented a review of the Scorpion serial-data-controlled robot and two approaches to remotely sending that data without the use of wires. Next month, "Techniques" hangs up the soldering iron for a while to investigate the design of an English-language translator program that can convert your typed word-like commands into the hardware-specific codes necessary to talk to Scorpion or any other foreign machine and transmit that data over the remote rf link.□

*Address correspondence to Mark Robillard, MJR Digital, PO Box 630, Townsend, MA 01469.*

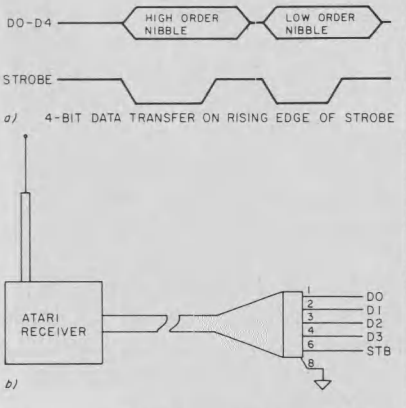



*Fig. 6. a. Timing waveform for a four-bit data transfer.*
*b. Typical receiver data connections.*

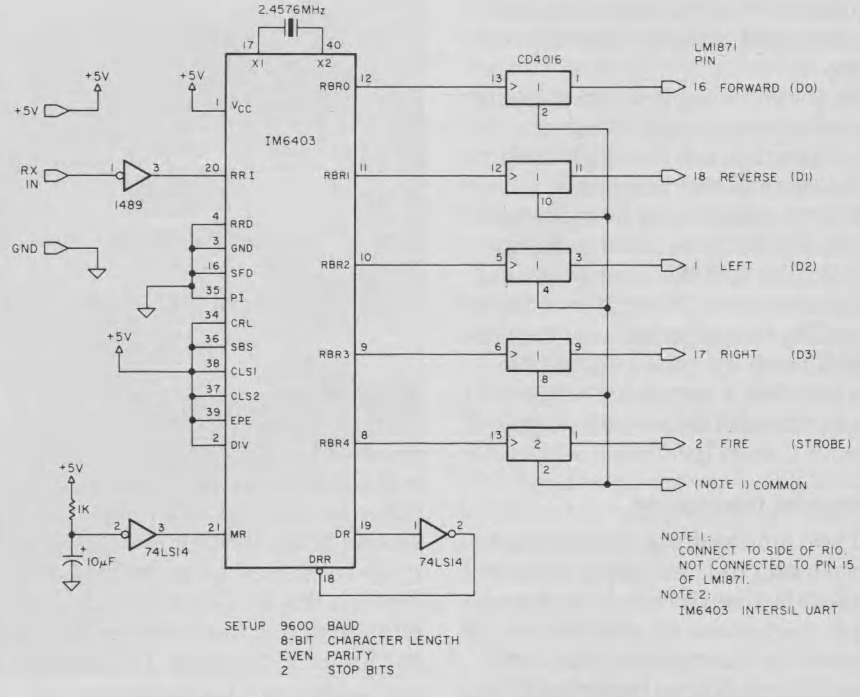



*Fig. 7. Schematic of computer interfaced joystick controller.*

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# Covering All the Databases

*In part 2 of his three-part article on database management programs, Shawn Bryan reviews dBase II, Condor 3 and Data Base Manager II.*

By Shawn Bryan

## dBase II

Ashton-Tate
10150 West Jefferson Blvd.
Culver City, CA 90230
Price: $700

## dOldest or dBest?

dBase II is the granddaddy of relational database managers for microcomputers. It started out on Z80-based systems and was later ported to the newer 16-bit systems. It's the first truly powerful relational database management system for micros. It's still powerful, but other programs have come along and improved upon the original, much as 1-2-3 has surpassed VisiCalc.

At the same time, dBase II is more powerful than ever because so much software has developed around it—dGraph, dForms, dThis and dThat. That small d shows up everywhere you turn. dBase II is pervasive, and every article on database managers at least pays lip service to the original. dBase is, after all, a tradition.

### dDocumentation

The first tradition that dBase II set is including a manual that's practically undecipherable. Ashton-Tate has already been taken to task for publishing such poor documentation. I'm happy to report that some real improvements have been made in version 2.4. The manual is now typeset, which improves its appearance remarkably.

For the price Ashton-Tate charges for this product, I'd expect to receive a manual written specifically for my system. Not so. There is a series of system specific notes and addenda at the front, but the manual itself avoids system specific references.

The best thing the dBase people did is put together a tutorial for version 2.4. The tutorial is on disk and takes you through a complete dBase II programming cycle. It's written in a conversational style and even addresses you by name. By the time you complete the tutorial, you're reasonably well-versed in the intricacies of dBase II. I commend the dBase II people for this effort, and I recommend that other manufacturers take a look at this process for acquainting customers with their programs.

Also included with the tutorial is a sample applications disk with several demonstration applications ready to run. These are used with the limited system disk to give you an idea of the program's capabilities. When you purchase dBase II, you receive a sample system disk along with the full-fledged system disk. The system disk is sealed in a plastic bag and is limited to running applications with up to 15 records. If you find the sample is beyond you, send the package back with the system disk still sealed, and your purchase price will be refunded. No other manufacturer offers such a liberal refund policy.

### dOperation

When you start dBase II, the dBase prompt, a period, greets you in the command mode. In this mode, you enter any valid dBase command and the program executes it. For example, you can tell dBase to sort a file or select records or process a command file. Help files here include help on the commands that you execute from this level of the program.

This is also the framework upon which programmers build applications. dBase II applications programs are really command files that execute the dBase II commands just as if you're typing them from the keyboard. A command file is an ASCII file that's read by dBase one line at a time, and each line is executed as if it's hand-typed.

### Surprise

One of the things you expect from a program with the following of dBase is that, by now, it's thoroughly debugged and offers no unwanted surprises. That's not the case, however, and bugs chronicled in earlier versions of dBase still appear with some regularity.

Unfortunately, Ashton-Tate hasn't seen fit to upgrade dBase from its eight-bit origins. This is most apparent in some of the limitations imposed on the user (only two files open at once, a 1000-character limit on record length and a 32-field limit). While these limitations aren't a problem for any particular application, they speak to the fact that dBase doesn't flex all the muscle now available on the microcomputer. Ashton-Tate is rumored to be working on a new 16-bit version of dBase that addresses these limitations. That event is long overdue.

Therefore, even though dBase has a nice tutorial and lots of fans who lived through learning it (who never want to go through that agony again), I find it hard to be enthusiastic about a program that's living in the past and resting on its laurels.

dBase is a nice eight-bit program, but it doesn't really belong with the heavyweights here. It's also overpriced when compared with R:base or KnowledgeMan.

The problem is, dBase was the original, the one and only, so people bought it or nothing at all. This led to a large contingent of dBase owners who praised dBase (since there was nothing to compare it with) as the one and only program to buy. This was a self-fulfilling prophecy and more people bought. As a result, a large base of applications software, user groups, support centers and so on developed. dBase has achieved cult status.

### Resting on Laurels

As I said earlier, however, dBase rests on past performance. dBase isn't cost competitive or performance competitive with the best in the marketplace. This fact will eventually influence the people buying database management software.

Other enhancements to the 2.4 version include the use of color and better use of the function keys on the PC. You set up macros (little command files assigned to a single key) and call them with a single keystroke, something not possible before the release of this version.

Ashton-Tate has also announced a multi-user version of dBase II. This version doesn't enhance the existing command structure, but it allows users of networked computer systems to work on dBase files simultaneously. In this respect, Ashton-Tate is ahead of the competition.

What's missing from dBase II? For one thing, quick reports. This is dBase's weakest area. With KnowledgeMan and R:base, a report is sorted as you wish with a few keystrokes. With Condor and dBase II, you sort the file to another file before you print it out. The utility of a database manager is severely impaired when quick and dirty report capabilities are missing.

Also missing is security. dBase II doesn't provide for passwords, and the data in the file created by dBase II isn't protected from prying eyes. While many applications don't need any security features, I'm reluctant to use this program for a payroll or other sensitive application.

Offsetting my criticisms of dBase II are several favorable considerations. First, a wealth of information is available on this program. A catalog of run-time applications, called *Application Junction*, is published by Ashton-Tate. The last version of that catalog I saw has 35 pages of applications for dBase II. These applications run the entire range of your imagination and include general categories covering engineering, insurance, inventory, legal, leisure services (e.g., hotel/motel management), medical/dental, property management and so on. Each page of the catalog has seven or eight programs ready-made for dBase II. Some cost little or nothing; others are expensive. The point is, there's probably an application already written in dBase II that does what you want to do—a valuable asset if you need to get something running quickly.

Another advantage of purchasing dBase II is that there are many people around who've worked with it for a long time. They know how to get the most out of the program, and they can set up a custom program for you relatively quickly. Most other programs are new enough that such a base of support isn't yet available. Another plus is that a number of courses are offered in the program, both by schools and by professional dBase trainers (for confused dBase II users). If you want to learn dBase II, you can probably find someone to teach you.

Last but not least are those bugs. While I don't like buggy software, I like surprises even less. At least with dBase II, the bugs are documented. All software has bugs in it. The key is to get rid of the worst ones and know about the rest. Documented bugs are less dangerous because you can work around them. dBase II may have a few bugs, but I don't think any are left that haven't been identified, chronicled and placed in the public eye.

If you own dBase II, my apologies for casting a stone or two at the program you worked so long and hard to master. If you still have to make a decision, look carefully for the program that does what you need to get done. dBase probably does whatever you want, but it doesn't do it as fast or with as large a database as some other programs.

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## Condor 3

Condor Computer Corp.
PO Box 8318
Ann Arbor, MI 48107
Price: $650

## Condor: Put Wings on Your Database Manager

If you think a Condor is a large, mysterious South American bird, you're right. But Condor is also one of dBase II's oldest head-to-head competitors for database management's Hall of Fame.

Condor Computer Corp. of Ann Arbor, MI, markets this program. It began on the eight-bit systems just like dBase II and was ported to the 16-bit IBM PC and compatibles. In the process, the original Condor became Condor 3, the latest version of the program and the most powerful. Condor 1 is still around, but Condor 3 is the subject of this review and offers a good look at how a program can migrate upwards from eight-bit to 16-bit implementation.

### Manual Split

Condor 3's documentation comprises two manuals in a bright orange slipcase. If you're lucky, you can get all the material into the binders. Mine barely fits. Condor needs to give serious thought to buying larger binders. The user's guide, a tutorial manual, takes you through each step required to write a Condor program. Condor is a programming language, so the tutorial is a necessity for most people. It offers numerous illustrations and the instructions are generally clear. The typesetting job isn't particularly flashy, but the information is there.

Condor's documentation is generic; that is, it isn't system specific. Sometimes the old days of CP/M and eight-bit systems still come through. A five-page installation guide for the IBM PC customizes the documentation for the IBM user. This guide explains how to make back-up copies of the program, which isn't copy protected. Cursory instructions on how to install Condor on a fixed disk are also furnished.

After you complete the first manual, you'll have a pretty good grasp of the program. The user's guide is backed up by the reference guide. This manual offers the experienced programmer most of the information he needs to understand what makes this program tick. A command summary, in alphabetical order, is followed by appendixes on various conventions used by the system, error messages you encounter and Condor specifications. The split between the two manuals works well. The person who needs the manual gets detailed instructions with pictures to help him, while the more expert user gets a manual of command syntax and other conventions and specifications important to programming the system.

One oversight in this version of Condor is the lack of implementation of the function keys available to the IBM PC and many compatibles. In a quality package, this is really an unpardonable oversight. Sufficient time has passed to provide users with this simple courtesy, and substantial savings in time and frustration are possible when these keys are properly used. It's also unfortunate that the people at Condor chose to ignore the fact that most keyboards these days have cursor control keys—another leftover from the generic documentation. The documentation consistently talks about using the control key to control both cursor movement and the insert and delete functions. The other keys work; they just aren't documented. This is just plain frustrating!

Once you get beyond these quibbles of mine, Condor looks pretty good. I confess I like many of its features, even if I do complain about some of its shortcomings. It's easier to learn to use than dBase II, but it loses ground to dBase II in terms of power and flexibility.

### Hocus Pocus

While Condor isn't copy protected, getting it up and running for the first time does require a little bit of hocus pocus. You're given a registration number and a license number for the program on your software registration cards, and you're prompted to enter your license number the first time you use Condor.

> Data Base Manager II may be the best buy of this batch of programs, and it isn't short on features or power.

Thereafter, if you install the number, the process is automatic. If you choose not to install the number, then each time you run Condor you have to enter the license number.

The Condor prompt is the same as the DOS prompt except for the addition of a single "is greater than" (A>>) symbol. Condor is a module that resides on top of DOS and maintains a 28KB workspace that, if it isn't overwritten from your application, is available before and after you run other programs. You can run other COM programs from Condor and return to Condor from your application program without ever actually going back to DOS or rebooting the system. This is probably useful in some applications, but I've yet to isolate a particular case where I could use such a feature.

Condor uses a screen-oriented method of database design. To create a database, you define the information you'll be putting in it by typing the form you'll use for input on the screen. The method is simple and straightforward. Type the field name followed by a number of underscores that define the field length. When you finish, press the Control-E key and the file format is saved.

The next step is the actual definition process for the data fields. You enter each field name followed by the characteristics you wish it to have (alpha field, numeric field, decimal field, dollar field and so on). The program automatically picks up the value of field length when the type of data is entered. What's wrong with this process is that it's too easy to build a data set that turns out to be larger or more cumbersome than needed and poorly designed for retrieving desired information. Because all you do is paint the form on the screen, the temptation is to sit down in front of the machine and start typing in your database with no thought of organization or retrieval. Here, a little prevention is worth several pounds of cure. No one should create a database without a map that at least shows where you want to go. Preferably, you'll also know the route to take to get there, but a clearly defined destination is imperative; otherwise, you won't know when you've arrived.

### No Remarks

The actual data management tools of Condor are unremarkable. The program uses a command syntax similar to the other large programs. You sort, index, reformat and manipulate your data in as many ways as you want. When you've finished with the manipulation, you then begin to think about reporting the data.

Reporting is one area where Condor shines. Condor has, by far, the best report documentation of all the programs in the big league. The manual has a comprehensive 80-page section on the report writer. This section looks a lot like many mainframe efforts I've seen. The documentation suggests that the way to create a good report is to use a form layout sheet, something with which most mainframe programmers are familiar.

A fair amount of effort went into making sure you understand that a report requires some design, not just a free-form drafting session. While the free spirits in the audience may immediately react to the idea of planning a report in advance with disgust, I have had enough experience with small and large systems to know that a little front-end work saves a lot of fixing later.

After you decide what you want your report to look like, Condor makes the actual design process a snap. To assist in locating your position on the screen, Condor allows you to draw a grid on the screen that shows where you are. This saves smudges on the monitor screen due to trying to count spaces and lines.

Creating the actual report format is as simple as typing it on the screen. The program reads what you place on the screen and puts it on paper the same way. The specification of headers and footers is easy since the program prompts you

about each line of your report page, asking how often the line is to appear (each page, last page, first page, every line, on break before or after section).

A long and short method of report specification also gives you some flexibility. If you wish to define a formal report, the full report definition process is the way to go. But for quick and dirty reports, Condor allows for a short method that simply selects all records and prints them out. The long method permits double spacing, special print styles and other attributes that belong to a formal report. I expect that the short report form is used mostly to check the appearance of a report you just designed or to get out quick and dirty reports because it doesn't offer much in the way of options. The long form provides every conceivable option to define the final appearance of your report.

### Creation with Wings

Condor has created a capable database management program. Its best features are the screen design and report design features. The rest of the program is meat and potatoes database management—the work is done just like other programs. This doesn't mean I don't recommend Condor. Since input and output of data is what a database management program is all about, the importance of a user-friendly input/output interface can't be overemphasized. Condor is very friendly on both counts. The beast may be a bird, but the bird can put wings on the creation of reports and data entry process, something some of the other muscle programs can't claim.

## Data Base Manager II

Alpha Software Corp.
12 New England Executive Park
Burlington, MA 01803
Price: $295

## Data Base Manager II: The Integrator

One of the most flexible and interesting menu-driven database management programs is Data Base Manager II from Alpha Software Corp. Data Base Manager II, alias the Integrator, is a software package that combines database management functions with an integration function. The program works with VisiCalc, 1-2-3 and Multiplan spreadsheet files, as well as text files produced by WordStar and other word processing programs. This program is especially interesting because IBM chose it for distribution through its product centers without the IBM logo—one of the first programs honored by IBM in such a fashion.

> Reporting is one area where Condor shines. Condor has, by far, the best report documentation of all the programs in the big league.

### Plain English

The Data Base Manager II manual is an IBM-sized three-ring binder, nicely typeset and filled with samples of how the screen looks as you use the program. In addition, Alpha Software provides a cassette tape to talk you through starting the program, complete with the sounds of the clicking keys, the pressing of buttons and the whirring of disks. The tape is very basic and only useful for a novice computer user.

At the back of the manual are sample medical forms, dental forms, property management forms and time and billing statements, among others. How those forms can be integrated with VisiCalc, 1-2-3 or other spreadsheets to create a full-fledged financial reporting system is discussed. These useful examples help explain how you can use the program. While your specific application may not be represented in the samples, one of them is probably close to your requirements. A few simple modifications give you a custom program for your problem. Perhaps the best thing that these samples do is give you some ideas about how to use a database management program.

The section of the manual that deals with the link between this program and WordStar and other word processors has an excellent tutorial on how to use Data Base Manager II to create form letters with a mail merge capability. Again, the instructions are written in plain English and are easy to understand. If you already have a mail merge program, you might wonder why you need this. Remember that this program allows much more powerful activity than just mail merges. By using the select capabilities of this program, it's a simple matter to send letters to only those people who owe you more than $100 and who are more than 60 days delinquent. All of the power of the database manager is available to you in sorting out what mail is sent to whom.

Data Base Manager II also borrows a trick from the mainframe computers. It has phonetic search capabilities. If you know the first letter of the word you're looking for, there's a pretty good chance the program can find it even if you don't know the rest of the spelling. If you've ever tried to have a less flexible database manager find a particular name or word you can't remember how to spell, you know how nice a feature this is.

### Feature Facts

Data Base Manager II runs under MS DOS and PC DOS 1.1 and 2.0. It isn't copy protected and can be copied to a fixed disk. Since it's menu-driven, it's easy to use. Getting lost takes some real effort on your part. When you start the program, you're given a catalog of the Data Base Manager II files already available. You may elect to work with one of these files or define a new file, or you may go directly to the link program, where you swap data to and from Data Base Manager II and VisiCalc, Multiplan, Lotus 1-2-3 and WordStar. If you choose to work with the database management portion of the program, the master menu appears.

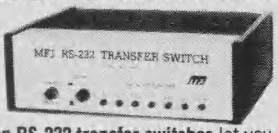
This menu contains 18 separate options, including view data, enter data, sort data, search data, delete data and so on. You select by entering the number of the particular activity you wish to pursue. This selection takes you to the next set of menus. The process is the same for all available options.

My experience with menu-driven programs is that the menus often get in the way and slow you down. I'm happy to report that, in this program, that doesn't happen. Data Base Manager II moves you between menus very quickly. The program reacts to your last command without long de-

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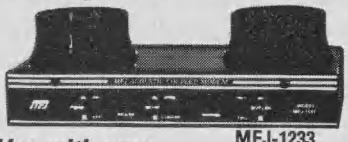
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lays, which speaks well for the design efforts of the people at Alpha Software.

If you want to create fancy input screens, Data Base Manager II may disappoint you. When you define your record and are ready to enter data to the fields, you are given a vertical listing of the field names and a place to enter data. There's no full screen data entry capability in Data Base Manager II—not a particularly significant omission in my opinion. For the price, this program offers as much as many others costing hundreds of dollars more. What you get are good basic data entry screens that don't require any time to be programmed.

The database management functions of this program include the ones you'd normally expect. You can request an in-memory sort of up to 2500 records, or if you wish to perform multilevel sorts, then you have the option of requesting multilevel disk sorts. Wild card searches and phonetic searches are permitted. Various field calculations are supported, including date arithmetic.

### Separated by Integration

The feature that sets this program apart is the integration function. If you own Lotus 1-2-3, for example, and want to swap data in and out of a database, you normally write out a print file and convert it to your database manager, or you write it out as a worksheet file and then convert it to a DIF file. These extra steps quickly discourage any thoughts you have of tying your database and your spreadsheet together.

This is no longer a problem. Not only does Data Base Manager II read 1-2-3 worksheet (WKS) files, it also writes them. You can also use the DIF files supported by many spreadsheet programs and the sylk files supported by Multiplan. I moved data back and forth with DIF files and 1-2-3 worksheet files and never lost a digit. The whole process is menu-driven and works without pain or effort on your part. The program also works with any normal ASCII table, although here you have to be careful to correctly define your field lengths so data is placed in your file in the right places.

Data Base Manager II also supports what Alpha Software calls the DEX or data exchange format. This format lets you look at any ASCII file and select data from that file to be added to your database by pointing at it. This option permits you to select information from documents created on your word processor and add it to your database. Addresses and columnar data are two examples of data that is a candidate for this type of transfer.

The report writing capabilities of Data Base Manager II are adequate for almost any normal reporting. Mailing labels are also an option. Headers and footers are supported, and the program automatically tabs to the correct position for your fields to print, based upon the length of the fields you select. You can modify the format used to print data during the report definition cycle. Not supported are special fonts used by many printers. IBM, Okidata, IDS, Prism and NEC printers are all supported, but you can't change fonts on a report in midstream.

Alpha Software also makes good use of the function keys available on the IBM PC. They handle automatic repeating of fields from one record to another, automatic acquisition of the system date and quick movement from the top to the bottom of a record. The F10 key almost always gets you out of trouble and back to the main menu.

### Best Buy

Data Base Manager II may be the best buy of this batch of programs. It's the most inexpensive at $295, but it isn't short on features or power. If you need a versatile and easy-to-use program, consider Data Base Manager II. If you do spreadsheet work and often wish for a program that works directly with your spreadsheet for data manipulation, Data Base Manager II is in a unique position to help. The Alpha Software people are most courteous over the phone and stand behind their product with service and a product upgrade plan. I recommend it.■

*Next month, Shawn Bryan wraps up his three-part series with reviews of the Concentric Information Processor, ResQ and Aura—we'll also include a comprehensive chart comparing all eight packages. Stay tuned.*

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# WordStar and dBase II: A Record Performance

*MicroPro's MailMerge program has certainly enhanced WordStar, but not if your records are maintained on dBase II. Here's a way to produce form letters by merging text files created from dBase II records with a WordStar letter using MailMerge.*

By William L. Moore

MicroPro International's MailMerge program extends the usefulness of the company's popular WordStar text editor by providing a means for WordStar users to produce form letters. At print time, MailMerge links a data file containing addressee information with a file containing the body of the correspondence, and the result is a stream of letter-perfect, personalized letters all ready to be signed, stuffed and entrusted to the U.S. Postal Service.

As a volume form letter combination, however, MailMerge and WordStar have one major shortcoming. Neither provides a convenient means of maintaining data files, i.e., addressee files. For example, there is no sort capability, a must for those wishing to take advantage of reduced postal rates for zip-sorted mailings. Further, subsets of files—for example, all addressees within a particular state—cannot be conveniently compiled for special mailings. Nor is there an efficient means of locating and manipulating individual records for editing, deleting and so on.

The reason for the WordStar/MailMerge lack of versatility is that "data files" containing addressee information used by these programs are simply ordinary WordStar text files and any necessary file management tasks must be performed using WordStar's text editor. Thus, these programs are relegated to light duty only. It would be too cumbersome and time consuming, for example, to use WordStar to maintain a relatively modest file of 100 records.

Of course, database management programs are much better at maintaining records than are text editors. MicroPro's DataStar and InfoStar fit the bill for WordStar users. These database programs produce the types of addressee files required by their companion programs, MailMerge and WordStar.

Unfortunately, all of this provides little consolation for WordStar users whose customer records, student records, employee files, membership rosters, lists of prospects, suppliers, contributors and so on are maintained with some other software, such as Ashton-Tate's popular dBase II. Many a dBase II user has attempted to read dBase II files with WordStar and, having failed, darkly proceeded to generate neat printouts of names and addresses destined to be retyped (hopefully, by someone else) in the required MailMerge format. And the thought has probably occurred to each of these individuals that it would certainly make life a lot easier if dBase II could produce MailMerge-usable files.

Well, dBase II can. This article describes a straightforward procedure for producing form letters by merging text files created from dBase II records with a WordStar letter file using MailMerge.

### Mail Program

Central to this form letter procedure is a simple dBase II command file program I call Mail. Listing 1 shows the Mail program. The program allows you to specify the data file containing addressee information (the dBase II input file) as well as the name you wish to assign to the newly created text file (the output file). Mail proceeds to read data from the input file and then create the text file needed by MailMerge, assigning the name you provided. When finished, the program returns you to dBase II.

Key to the program are two dBase II commands, Set Alternate To [<filename>] and Set Alternate On. These commands allow output to be "echoed" to a designated text file instead of to your printer or screen. You can devise print statements that contain both the data fields necessary for your form letters and the formatting specifics required by MailMerge—essentially, commas inserted between fields as delimiters.

The next steps are precisely the same steps you follow to generate form letters using WordStar and MailMerge, except that there's no need to key names and addresses into a special file since dBase II has already taken care of that for you. You simply use WordStar to compose a letter document containing your message as well as the various embedded dot commands expected by MailMerge. After your letter has been saved to disk, you run the MailMerge program in the conventional manner, and handsome letters will immediately issue forth.

Of course, the same dBase II text file can also be easily linked with a WordStar file to produce envelopes or mailing labels for the addressees.

### Step By Step

Those who venture beyond the first few sections of the dBase II manual are aware that one of the most powerful and unique features of dBase II is its programmability. dBase II programs are called "command files" and are distinguished from other files on the disk directory by their CMD

extenders (e.g., MAIL.CMD). dBase II programs created on computers with the PC DOS operating system have PRG extenders. Mail has been used on both CP/M and PC DOS systems without modification.

If you have some experience with command files, then the Mail program listing holds no mystery. It is essentially a do...while...enddo loop that sequentially reads records from a dBase II file and writes specially formatted lines to a text file.

If you're unfamiliar with dBase II programming techniques, the following step-by-step discussion will help you produce the necessary command file.

Boot dBase II in the normal way. Once you get the familiar dot prompt, you may find it convenient to input the command Set Default To B: (followed by a return), which notifies dBase II that all files are to be read from and written to the data disk in drive B. This simply eliminates the need to precede all filenames with the B: prefix. Of course, resetting the default drive is unnecessary if you have a one-drive system or maintain files on the same disk as the dBase II program.

Input the command Modify Command and follow this with a return. The program will request the name of the file you wish to modify. Respond with Mail or any other filename you wish to use. After you hit the return key, dBase II acknowledges that this is a new file and presents you with a screen that is blank except for a highlighted first line. You're now ready to input the program in Listing 1. (Note: dBase II recognizes the first four characters of command words. You can, therefore, economize on keystrokes by keying in MODI COMM instead of the full command, MODIFY COMMAND. Further, the rather cryptic command MODI COMM MAIL gets the ball rolling without dBase II having to ask for the name of the file.)

dBase II is equipped with a modest text editor that allows you to key in the required program lines and correct any mistakes you might make. Fortunately, if you know WordStar or have special function keys, you don't have to learn a new set of control commands. The now-familiar EXSD WordStar diamond pattern arrangement allows you to respectively move up one line, down one line, left one character and right one character.

You can also move ahead an entire screen by using Control-C. Control-Y deletes a line and leaves a blank space; Control-T deletes the entire line, text, space and all. Conversely, Control-N allows the insertion of a line. Again, omit the Set Default To B: statement if you're working with one disk drive. (Note: It's more convenient to use WordStar for keying in longer programs since its text editor is more powerful than dBase II's. If you use WordStar, use N from the no-file menu to open a nondocument file and remember to use the CMD extender in naming the command file. PC DOS users should use PRG as an extender. Generally, however, I find the dBase II editor to be quite satisfactory for keying in short programs like Mail and for debugging.)

Once you're satisfied the program is correct, execute a Control-W to write Mail to your disk. Once this is done, the screen clears and the dBase II dot prompt reappears.

### Using Mail

To run the program you need a dBase II file that can serve as an input file. As written, the program is set up to accept information from a file that has at least the following data fields: Title for the addressee's title (i.e., Mr., Mrs., Dr.), First for first name, Last for last name, Addr for street address, City, State and Zip. Other information can be in the file, but these six fields must be present for the program to work as written.

Running the program is simply a matter of using the command Do Mail and following this with a return.

The program proceeds to erase the screen and prompt you for the name of the input file and the output file; it then goes to work reading information from the input file and writing the necessary text file. The text file is listed on the disk directory with a TXT extender (e.g., MAILIST.TXT), and it can be examined and edited using WordStar. Again, it's best to do this by treating the data file as a nondocument file in order to disable various unnecessary formatting features, such as word wrap, margin justification and page breaks.

Table 1 is an example of what a short text file looks like. Each piece of addressee information is separated by commas as required by Mail-

```
                    dBASE II MAIL PROGRAM LISTING

****************          MAIL PROGRAM          *****************
*                        by W. L. Moore
*
SET TALK OFF
SET DEFAULT TO B:
ERASE
ACCEPT "NAME OF FILE YOU WISH TO USE? " TO INFILE
?
ACCEPT "NAME OF OUTPUT FILE? " TO OUTFILE
ERASE
@ 9,35 SAY "WORKING!"
@ 11,31 SAY "ONE MOMENT PLEASE."
SET CONSOLE OFF
USE &INFILE
SET ALTERNATE TO &OUTFILE
SET ALTERNATE ON
DO WHILE .NOT. EOF
  *
  *   Note: The following two lines print information from
  *   records in the input file to the output file in the
  *   format required by MailMerge.
  *
  ? #,","+TRIM(TITLE)+","+TRIM(FIRST)+","+TRIM(LAST)+","
  ?? TRIM(ADDR)+","+TRIM(CITY)+","+ST+","+ZIP
  SKIP
ENDDO
SET ALTERNATE OFF
SET CONSOLE ON
ERASE
RETURN
```

*Listing 1. dBase II Mail program.*

```
1,Mr.,George,Gold,101 Elm Ave.,Lincroft,NJ,07738
2,Dr.,Byron,Brown,2002 Sycamore Rd.,Ithaca,NY,14858
3,Mrs.,Betty,Blue,303 Oak St.,Pittsburgh,PA,15222
4,Mr.,Walter,White,4004 Maple St.,Fairview Park,OH,1
5,Ms.,Blanche,Black,5 Eucalyptus Ave.,Columbia,SC,29
6,Prof.,George,Gray,606 Pine St.,Chicago,IL,60603
7,Mrs.,Sally,Silver,77 Redwood Ave.,Arlington,TX,760
8,Mr.,Grace,Green,808 Sequoia Dr.,Mountain View,CA,9
9,Dr.,Thomas,Tan,9009 Spruce Ln.,Kent,WA,98032
```

*Table 1. Sample output from the Mail program.*

```
.DF B:MAILIST.TXT
.RV N,TITLE,FIRST,LAST,ADDR,CITY,ST,ZIP


April 19, 1984

&TITLE& &FIRST& &LAST&
&ADDR&
&CITY&, &ST& &ZIP&

Dear &TITLE& &LAST&:

I am writing to inform you that it is once again time for
our annual spring sale.  As one of our long-time customers,
&TITLE& &LAST&, this letter will admit you and one other
individual to this rare event which will begin at 10:00 AM
on May 1 in our main store.  Refreshments will be available.

This year, prices will be reduced by 25% to 50% on all mer-
chandise in stock.  I am certain you will want to take
advantage of these low prices.

I look forward to greeting you and your guest at the store.

Cordially,



Luther Bland III, President
Bland Clothing, Inc.
.PA
```

*Table 2. Example of a letter document formatted for MailMerge.*

Merge. The first item on each line is the dBase II record number from which the succeeding information was obtained.

This bit of information is very useful when it's necessary to go back into the original dBase II file to verify or edit information. If you have commas in your files and want them to print out and not be read by MailMerge as delimiters—e.g., commas that separate city and state—you must put them inside quotation marks. This is time consuming with large files. A good way to avoid this is to make city and state individual data fields. The commas are then placed in the body of the form letter. In other cases, potentially problematic commas, such as those separating firm names from "Inc.", can be quickly located with WordStar's find-and-replace feature and the necessary quotation marks inserted.

Regardless, remember that free-standing commas are always interpreted as delimiters by MailMerge and strange results can frequently be traced to stray commas (e.g., "...we sincerely appreciate your $Arkansas contribution...").

### Creating a Letter Document

After exiting dBase II, you boot WordStar in order to create your letter document. Table 2 is an example of a document containing a simple letter that uses the information put out by the Mail program. The first two lines are known as dot commands. These provide instructions to MailMerge. .DF specifies the name of the data file (i.e., MAILIST.TXT, the file created by the Mail program) and .RV reads the variable list. Dot commands other than those shown in the example can also be used. One very useful dot command is .AV, which allows you to input information from the keyboard and insert it into letters during printing.

After the date, the body of the letter begins with the address and salutation constructed from information contained in the MAILIST.TXT file. Appropriate information is inserted in the letter by MailMerge wherever ampersand-bracketed variable names appear (e.g., $ADDR&). Variable names placed within the body of the letter must be exactly the same as those shown in the variable list at the top of the document. For example, if you use uppercase in naming variables in the variable list, you must use uppercase in the body of the letter.

However, variable names shown in the variable list don't have to correspond to the original dBase II field names. MailMerge assigns variable names to information in the data file according to location; i.e., the first item it comes to is N, the second item Title and so on. Therefore, you can use whatever variable names you wish in the letter document.

The last dot command in the letter document, .PA, simply instructs the printer to eject the page after each letter is printed.

You can run MailMerge in the usual manner once the letter document is saved to disk.

### Customizing the Mail Program

The Mail program can be easily modified to accommodate various input database structures and various output file requirements. You only need to change two print lines. One of these lines is preceded by a single question mark and the other by two question marks. (These lines are annotated in Listing 1.) dBase II recognizes leading question marks as print symbols and sends information following a question mark to the screen, the printer, or, as is the case with the Mail program, a disk drive.

However, dBase II won't process a print line that exceeds 80 characters. Therefore, two or more print lines are necessary whenever several variables are used. This is accomplished with the dual question mark statement that

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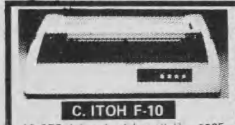
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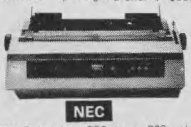
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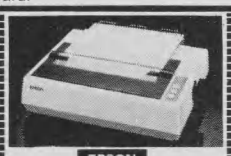
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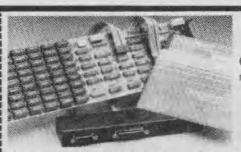
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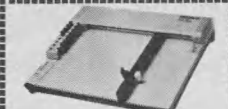


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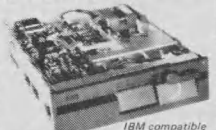


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tells dBase II to continue printing information on the same line (i.e., no carriage return or line feed is issued until all of the information for a record is written to the output file). Of course, the second print line is omitted altogether for relatively short data lists.

The rules for assembling print statements to produce MailMerge-compatible output are simple.

1) At least one space must separate beginning question marks (single or double) at the beginning of a line from other information on that line. Note that the number symbol (#) following the question mark in the first print line in Listing 1 instructs dBase II to begin each line with the record number. This is optional.

2) The dBase II Trim function must be used to omit trailing blanks. Information in the ST and Zip fields does not have to be trimmed since state abbreviations are all two characters and zip codes are always five digits.

3) Quotation marks are used for inserting commas between items.

4) Concatenation (linking items together) is achieved with plus signs.

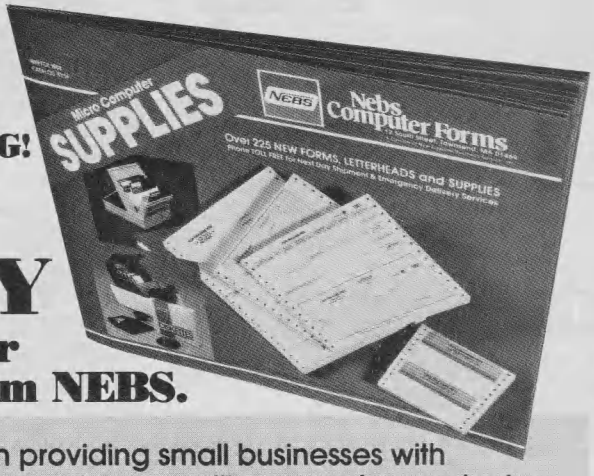
> This procedure harnesses two widely used programs and will yield considerable savings in time and effort.

As for dBase II file structures, I've found that the seven fields used in the example provided in this article allow maximum flexibility in selecting and sorting records and in developing form letters that look like conventional business letters. For example, constructing special data files by selecting certain states or zip codes is accomplished only if ST and Zip fields are provided for in the data structure. Similarly, zip-sorting is possible only if there's a separate Zip field. Individual Title, First and Last fields are necessary because the address should contain the addressee's full name (e.g., "Mr. Robert North") while the salutation should contain only the title and last name (e.g., "Dear Mr. North"). These fields also provide an opportunity to insert various combinations of the addressee's name in the body of the letter to further personalize it if desired (e.g., "Robert," "Mr. North," "the North family").

### Pulling It All Together

This procedure harnesses two widely used programs, MailMerge and dBase II, to produce form letters directly from dBase II files. It can also be adapted to a variety of other tasks that require combining dBase II information with text, such as filling in forms and certificates, producing post cards and so on. With a modest investment in time, this procedure yields considerable savings in time and effort.■

*Address correspondence to William L. Moore, 1889 Chantilly Lane, Hayward, CA 94541.*


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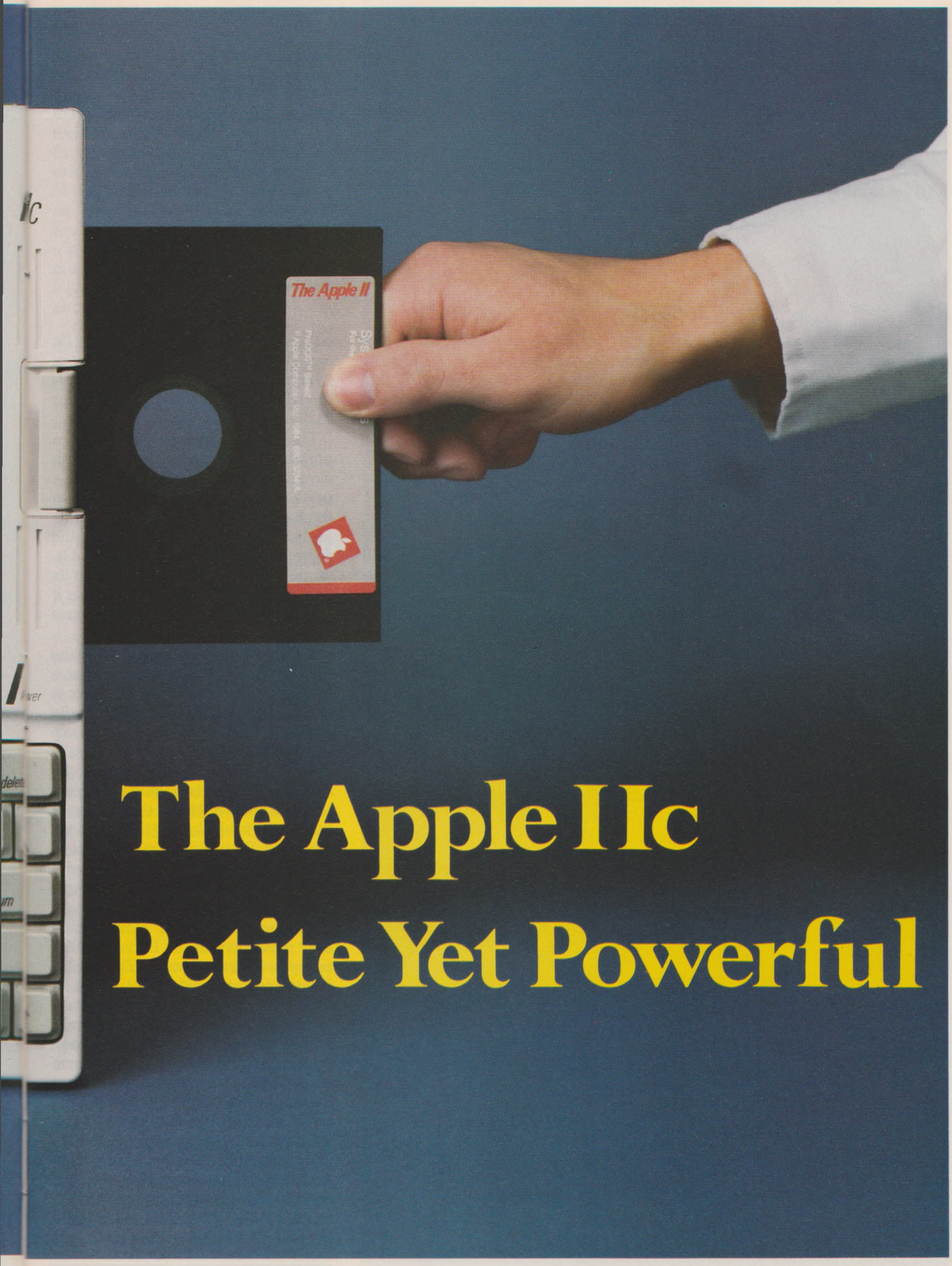
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disk use
esc
tab
control
shift
caps lock
return
shift




# The Apple IIc
# Petite Yet Powerful

*The Macintosh is a tough act to follow, but the introduction of the IIc has added fuel to Apple's fire. In the IIc, Apple has provided a II-compatible with 128KB and a disk drive—all in a 7½-pound package. This month, we answer the question, "IIc or not IIc?"*

By Keith Thompson
Editor-in-Chief

Last month *Microcomputing* gave you a preview of Apple's newest creation—the IIc. Since our "sneak" (as they're called in the trade), I've had a chance to spend some extensive time with a IIc. As a veteran II Plus user, I was familiar with how I expected a II to run and feel. The IIc provided some unexpected surprises and promises for the future.

The IIc represents the second major product from Apple Computer in 1984. In January, it introduced the Macintosh. At that meeting both John Scully, president of Apple, and Steven Jobs, chairman and cofounder of Apple, emphasized Apple's continuing commitment to the II. They said that unprecedented amounts of resources were committed to the II machine. The fanfare and effort surrounding the arrival of the IIc confirms their contention.

**Taking Aim**

The IIc is aimed at a mass market—the ads, packaging and IIc itself beg for it to be brought home and plugged in without ado. The machine is true to this claim. Using the included easy-to-follow instructions, the IIc can be installed within minutes. Everything you need to get started is thoughtfully provided in the box for $1295.



The IIc has been described as a portable and our preview last month gave it that label. In fact, the IIc isn't a portable in the same sense as you think of a Model 100 or other laptops as being portable. Nor is it in the same class as a Compaq or an Osborne. The IIc is a transportable in its own class. Its built-in handle makes it fairly easy to port around the house or carry in a briefcase.

I noticed one annoyance with the handle when using a television as a monitor. The IIc's rf converter box is attached to the rear within the handle area. If the converter is merely plugged in without fastening, it falls out easily. However, if it's affixed by screwing in the two built-in screws on the converter (this is the best way), the handle is blocked by the converter when the IIc is picked up. Instead of being able to grasp the handle with your full hand, you're forced to carry it with two or three fingers.

Another factor that slows down easy movement of the IIc is its external power transformer. This transformer adds considerable weight to the IIc. It weighs about five pounds, adding to the main unit's 7½ pounds. I also dislike machines that have power supplies that remain warm while plugged in. True, it draws negligible power in its ready state, but my house already has too many transformers plugged in for calculators, battery rechargers and so on. Accepting the fact that the transformer must be external, I would prefer a switch on the IIc that would circle back and totally switch off the IIc's power.

## Mouse

One of the more obvious technical advantages of the IIc is its direct mouse interface. Using a mouse that's identical (except for its color) to the Lisa and Macintosh mouses, the IIc advances the II family as mouse-driven machines. The mouse's ease of use reinforces the IIc's premise as an easy-to-learn and easy-to-use machine. The IIc mouse, available as a $99 option, plugs into the rear of the machine. A mouse for the IIe requires a plug-in card in addition to the actual mouse.

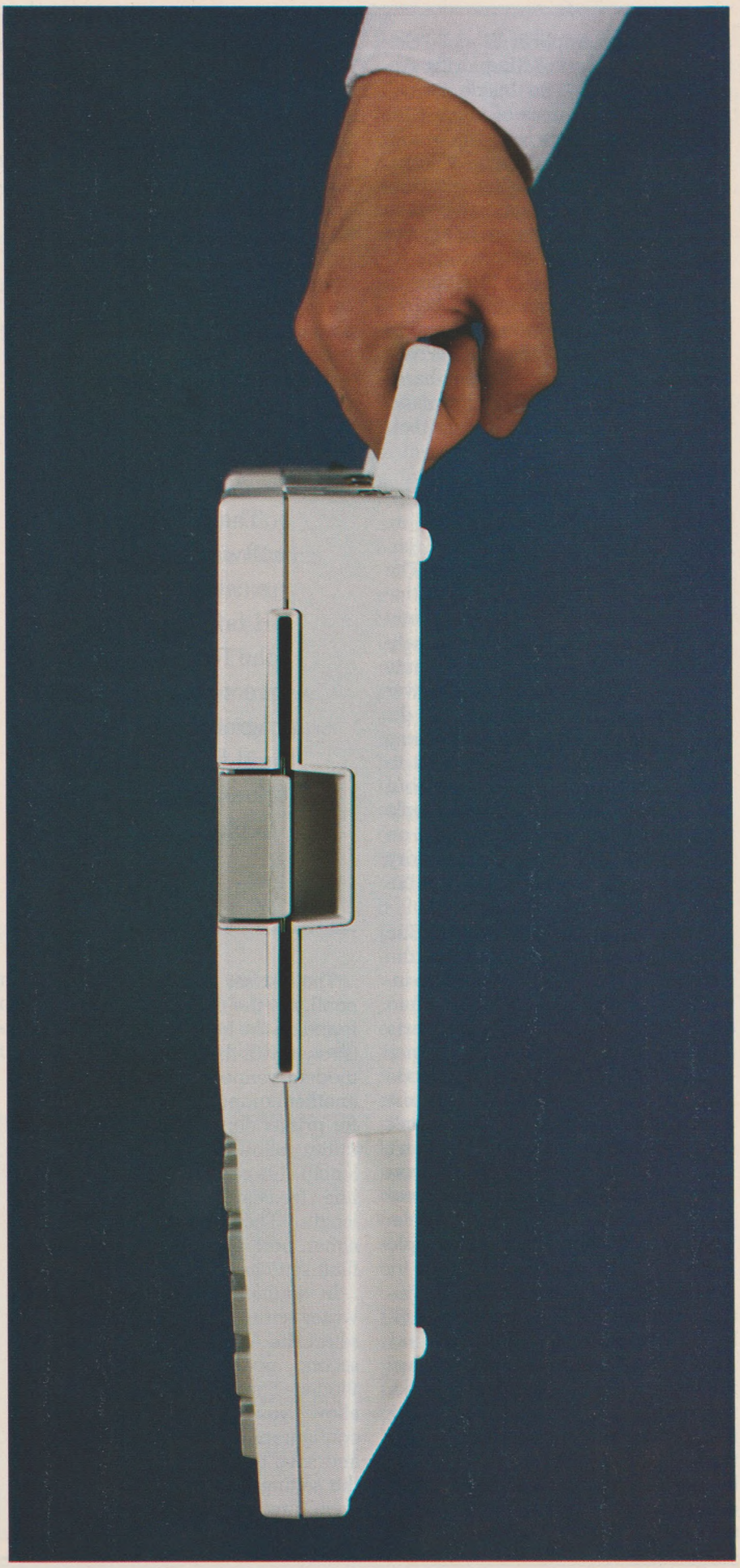
The premiere program for the mouse is Mousepaint. This program is a II version of Bill Atkinson's acclaimed MacPaint that runs on the Macintosh. Mousepaint was written by Apple II graphics wiz Bill Budge. Together, the IIc, mouse and color television (Mousepaint runs in color or monochrome) provide hours of fun. Budge's program runs surprisingly like Atkinson's, but with color.

Another program you'll want to try with the IIc and its mouse is a new program from Odesta called How About A Nice Game of Chess?. The game uses the mouse to choose pieces. It's not necessary to enter a pair of coordinates in order to move the pieces. The IIc becomes more of a real chess partner when all you have to do is click on a piece and click on its destination square. This game has a clever interactive tutorial for beginners and up to ten levels of play for intermediate and advanced players. Other software publishers, such as Monogram (Dollars and Sense) and Continental Software (The Home Accountant), have released new versions of their software to take advantage of the mouse environment.

## Software

Every purchaser of a IIc receives five disks filled with eight sides (some are readable on second side) of information about the IIc. Except for the System Utilities disk (I'll cover that one later), each of the disks contains interactive chapters on different aspects of the IIc. These tutorials can be used alone or with *An Interactive Owner's Guide*, a 143-page book that is included. These disks make an easy-to-install machine into an easy-to-understand machine.

Beginning with "An Introduction" and continuing through "The Apple



at Play," "The Apple at Work," "Getting Down to Basic," "Exploring Apple Logo" and "The Inside Story," Apple covers all areas of interest for new computer users.

For example, "The Apple at Work" describes word processing, electronic spreadsheets and data managers in the context of Apple's own integrated package called Appleworks. The tutorial explains the basic functions of each type of productivity tool before you actually step through exercises demonstrating each feature. Wrong answers are not greeted by a harsh beep, but by a careful, tactful explanation of why your answer isn't correct.

**Inside the IIc**

The disk "The Inside Story" is an imaginative odyssey through the insides of the IIc, explaining such jargon as ROM, RAM and booting. The explanation is written as a detective story with Sherlock Capslock and Nancy Novice. Nancy enlists the help of Sherlock because she lost some data in her computer due to a power failure. Sherlock explains in lucid detail why her data was erased. Nancy is no novice, though. I don't want to give away the ending of the story, but Nancy Novice is actually an Apple Computer employee checking up on Sherlock. At the end of the story there's a quiz. The entire story is entertaining and informative.

Apple, under the direction of Sue Espinoza, has really demystified the computer. In fact, the tutorials are interesting enough to use more than once. "The Apple at Play" resurrects a few updated Apple II classic games —Apple 21 and Space Quarks. Aside from these few games and an interest amortization program, the IIc doesn't come with any software. If you don't have Apple II software already, you must be prepared to buy the programs demonstrated, like Appleworks or a new release of Apple Logo.

Among the included disks is Systems Utilities. This disk is ProDOS-based but also works on Pascal and DOS 3.3 disks. The utilities disk copies, deletes, renames or locks/unlocks files. It also duplicates, formats or identifies and catalogs a disk. Any of these operations is easily performed by positioning brackets around the desired operation and pressing return. If you need help, it's always available on-line with a two-key sequence. The disk has a time-saving method of selecting more than one file for an operation, such as copying files from one disk to another. Instead of the older DOS 3.3 method of querying for each file, all files are selected at one time, and the copy is done for all of them immediately afterwards.

The disk also provides a second, more advanced, tier of utilities. You can create a subdirectory or set up a prefix for running under ProDOS. A particularly useful routine lets you verify that a disk is readable.

The majority of software already in existence for the II family runs on the IIc. However, *caveat emptor*. Some programs that run on the II family may not work exactly according to plan on the IIc.

The last set of utilities lets you reconfigure the two built-in serial ports found on the back of the IIc. One port (shown with the telephone icon) is for modem connection or connection to another computer. The second port is for printer connection. The configure utility allows you to reset word length, bit rate, parity, echo output, line feed/carriage return and line length. The reconfigure menu for either port lists four additional default settings.

In addition to the default Imagewriter settings, a single keystroke can select the Apple 300 or 1200 bits per second modem or the Apple Color Plotter. Three blank menu positions allow you to set three different configurations, if need be, and label and save the settings. The next time the settings are needed, you can get them directly without having to redefine the port. This program makes it possible to configure either port for any serial exchange of data easily.

**IIe Software Compatibility**

The vast majority of software already in existence for the II family runs on the IIc. However, *caveat emptor*. Some programs that run on the II family may not work exactly according to plan on the IIc. Why? There are a few reasons.

First, some software may appear to run satisfactorily but, in fact, may not look right on-screen. This software makes calls to the alternate character set contained in ROM. For the II family prior to the IIc, this alternate set was portable between the II, II Plus and IIe.

As I said above, the IIc is being pushed as Apple's mouse II. More and more software products will make use of the mouse interface. Apple has taken the alternate set in ROM and it has included some of the same mouse fixtures that are found on the Lisa (e.g., scroll boxes, arrows). Software that addresses these areas expecting characters will return these unfamiliar symbols.

When Apple realized that it was making this type of change in ROM, it notified software developers. Most of them recoded their programs to eliminate any problem, so not many programs have the potential for running into this. Your best insurance is to see if the software box says that the program is recommended for the IIc. Look for a bright yellow and red label that says "IIc." Your dealer has a list from Apple that describes what products may produce problems on the IIc.

Another problem that's easier to spot is when a disk refuses to boot properly. Some protection schemes make calls to ROM before successfully booting. They may hang with the changed calls in the IIc. Most of these schemes were in popular use three or four years ago. New programs, although locked, are more likely to run properly.

A few popular programs that I tried that didn't work are: Choplifter, DB Master 4.0, Dow Jones Market products, Frogger, Magicalc (in its 1982 version), Multiplan 1.06, pfs:File, pfs:Graph, pfs:Report, pfs:Write, Terrapin Logo (1982–83), TK! Solver and VisiPlot. Most of these companies have updated their programs to run

on the IIc. Others, I'm told, will exchange disks for updated ones at no or nominal charge. Considering the several thousand programs available for the II family, the list is suprisingly small and will shrink in the months to come.

**Documentation**

Apple has set an example for computer user guides that I hope every computer manufacturer will imitate. Each of the IIc's three books is in full color. The copy is well-written and supported by clear easy-to-see photographs. There is a conspicuous lack of jargon, and where terms are ambiguous, definitions are usually given in the margins. Where appropriate, there are summaries at the ends of chapters. Finally, the guides are written with a good sense of humor without being overly cute.

Three books come with the IIc. The first, *Setting Up Your IIc*, is short (20 pp.) and to the point. Its purpose is to get the eager new owner of the machine into action within ten minutes. Instructions and numerous photographs make it possible for the newcomer to immediately become familiar with what connects where.

The second guide is the main *Owner's Guide*. It is a spiral-bound 144-page book that progresses from "Meet Your Apple IIc" to "Programming." The book can be used alone or you may insert one of the interactive tutorial disks mentioned above. An appendix even charts the technical differences between the various Apple II computers.

The only criticism I have of the *Owner's Guide* is the lack of space used to describe Applesoft. A few pages describe ROM resident Applesoft and this chapter is shared with explanations of Logo. However, Logo is an optional software package. I guess I remember back to the days when the Applesoft tutorial and the Applesoft reference manual were included in the price of a II Plus. If Apple feels that only a minority of users are interested in programming these days, it might consider giving an Applesoft manual to those who return a card that's included in the IIc box.

The third book accompanies the system utility disk. It is appropriately not included in the *Owner's Guide* but stands by itself as a 49-page guide to all the utilities. Many screen prints simplify understanding the system disk.

**IIc or Not IIc**

The obvious question (which even Apple alludes to in its advertising campaign) is, given the choice, should I buy a IIc or a IIe? There are persuasive arguments for each machine.

One of the most notable differences between the two machines is that the IIc is closed. While third-party vendors may find ways to add slots to the IIc, the fact is that if this machine remains transportable, it will never be capable of running CP/M. It will never carry a music card or analog/digital board or any of the boards that third-party vendors have been so inventive in creating.

The obvious question (which even Apple alludes to in its advertising) is, given the choice, should I buy a IIc or IIe? There are persuasive arguments for each machine. In some cases, the IIc makes economic sense over the IIe.

Pin-outs of din printer port to DB-25 for Imagewriter:

1 DTR = #6 (DB-5)

2 TXD = #3

3 GND = #7

4 RXD = #2

5 DSR = #20

For modem cable reverse RXD and TXD connection on either end of cable.

Arguing for the IIc, the machine has most (even more) of what people want in on-board cards. Apple polled Apple II owners to discern what the most popular peripheral cards were. It decided to include these more popular options into the closed IIc box.

A deceptively large quantity of cards is built into the IIc. Two serial ports (responding as Apple Super Serial Interfaces in the IIe) will serve most purposes as far as communications and printing are concerned. The joystick port, as found on the IIe, has been expanded to accommodate a mouse. The disk controller, required as a card on the IIe, has been reduced to a chip that will handle one external drive in addition to the on-board drive.

There is no possibility, though, of the IIc adding more than two drives. Some productivity tools, such as large data managers, work better with multiple drives. The IIc has video outputs that are simply not available on the IIe. The IIc engineers have extended both serial and parallel video signals to a 15-pin connector in anticipation of as yet undeveloped video technologies. The IIc has its own 80-column capability available at the touch of an external switch.

The IIc is limiting in that there is no built-in parallel printer port. Parallel printer owners will have to purchase third-party converter boxes if they want to continue to use their present printers. These serial-to-parallel boxes are available now. The IIe has diagnostic firmware whereas the IIc has none. If the IIc malfunctions, it must go to the dealer for service. Apple says that its compact single digital board can be diagnosed and replaced more easily than the IIe's. The IIc comes with 128KB as standard equipment. With the IIe, it must be added. With earlier IIs, 128KB is possible but not supported by Apple.

If you anticipate using most of the IIc's built-in features, then the IIc makes economic sense over the IIe. If you are wed to WordStar or dBase II or any of the other popular CP/M programs, you'll want to stick with a IIe. If you just have to be able to pry off the top of your machine, you'll want the IIe, too.

There is one more reason to chose the IIc. Because it's a closed system,

it's an environment that software developers will want to work in. A program written for one IIc will work on every IIc. Every computer will not be a custom design with its own combination of cards from different manufacturers. Also, the IIc has as yet undeveloped capabilities that will allow some new software to run on the IIc only. The 65C02 has 27 additional instruction sets that won't execute on the earlier 6502 ICs. These instructions will speed up graphics and allow more efficient number crunching on the IIc.

Apple has, luckily, not only decided to continue to manufacture the IIe but has made significant price cuts for a low-end IIe machine. For $995, you receive a basic IIe, controller card and disk drive. The starter system will suit many purposes. You might want to consider, though, what you ultimately want from your IIe. What is included as built-in on the IIc at $1300 would cost significantly more if peripheral cards were added to the stripped down IIe. The IIc would have the added benefit of features not available on the IIe, as I noted above.

A second bundle consists of the IIe, the new slimline duo drives, the Mon-

## Apple II Forever Apple II Forever Apple II Forever Apple II Forever Apple II Forev

Event marketing is what Apple President John Scully called the April 24, 1984, event surrounding the introduction of the IIc.

Picture nearly 6000 people gathered at Moscone Center, San Francisco (the same hall being used by the Democrats for this year's presidential nomination convention). In front of you is a stage with three screens behind the podium. Each screen almost spans from floor to ceiling. A voice introduces Steve Jobs, cofounder and chairman of Apple Computer, who bounds onto the stage with white shirt, bow tie and denim jeans supported by suspenders.

Screens on each side of the stage come alive with a video of Jobs onstage. The crowds quiet as Jobs gives a progress report on the first 100 days for Macintosh (it is now day 92). He carefully chronicles the past 92 days and states that Macintosh has surpassed the internal 50,000 unit goal and will have, by day 100, over 70,000 installed units.

While he talks, another 30-foot video screen displays a Macintosh screen that graphically depicts Mac's progress over the past weeks. Dealers and Apple employees rise in cheers.

A multimedia audio/visual presentation segues into the next portion of the program. Steve Jobs is onstage along with John Scully and Apple cofounder Steve Wozniak. Each has a few words to say about the Apple II phenomena before leaving John Scully onstage to address the keyed-up audience and to make the formal IIc introduction.

A rapid fire of slides and stereo music describes the IIc. No one has seen it yet. Scully asks if anyone in the audience happens to have a IIc. A small cadre of Apple employees in the audience stands—as spotlights find them—they wave IIcs over their heads. The audience's appetite is whetted.

Scully goads the audience by asking whether anyone has seen the machine close up. When the answer is "no," 500 more Apple employees sprinkled throughout the Center quickly unzip their carry bags and begin waving the IIcs over their heads. By now, spotlights have been redirected to the audience—the lights begin searching wildly over the crowd.

The IIcs glisten in the light. Machines are quickly passed up and down aisles for all to touch before the attention is once again on Scully. He carefully explains Apple's marketing plan for the IIc with the aid of photos, graphs and charts displayed behind him. In an emphatic statement of the machine's immediate availability, he offers each dealer a IIc to take back home by the end of the day. He sells each IIc for $400 and provides hotel room delivery for the dealers.

To emphasize the quantities available for shipment, a curtain falls on each side of the stage revealing hundreds, if not thousands, of IIc boxes stacked from floor to ceiling. It is an impressive presentation. Finally, he introduces the key IIc team leaders who come onstage wearing fancy tuxedos. The session finishes with a loud media show sounding the score of "Flashdance." *"We are Apple...leading the way...what a feeling!"*

Scully sends the frenzied dealers to their regional breakout sessions to place their store orders for IIcs.

The press, meanwhile, adjourns to the front of the mountain of IIc boxes for a press conference. Because of the excitement the IIc has generated and because of the combat lines drawn between Apple and IBM, great numbers of the press are there. *Time*, *Newsweek*, ABC, CBS, NBC—all want to hear how Apple plans to slay Goliath. The press cannot resist a good fight. Apple comes off smooth and convincing.

The remaining dealers and press are then treated to an Apple-sponsored exposition of 100 software developers who have Apple II wares to display. The fair enforces one of the IIc's selling points—it has the largest software base of any microcomputer in the world. A few products, dubbed "IIc featured products," are demonstrated. These are products that take advantage of one of the special IIc features.

The 6.2 Richter scale Californian earthquake made the exposition day particularly memorable. It seems that Apple stops at nothing. Apple bussed all participant's to one of five local hotels for an exquisite buffet

itor II and an extended (128KB) 80-column card. The suggested retail price for this system is $1795. A final bundle is a loaded IIe that's the same as the $1795 system with the addition of a 5MB Profile hard disk with accessory kit and Catalyst. The IIe will be sold to two classes of users—those who just want a bare bones machine and those at the other end of the user spectrum who need the expandability that only the IIe can provide.

### Conclusion

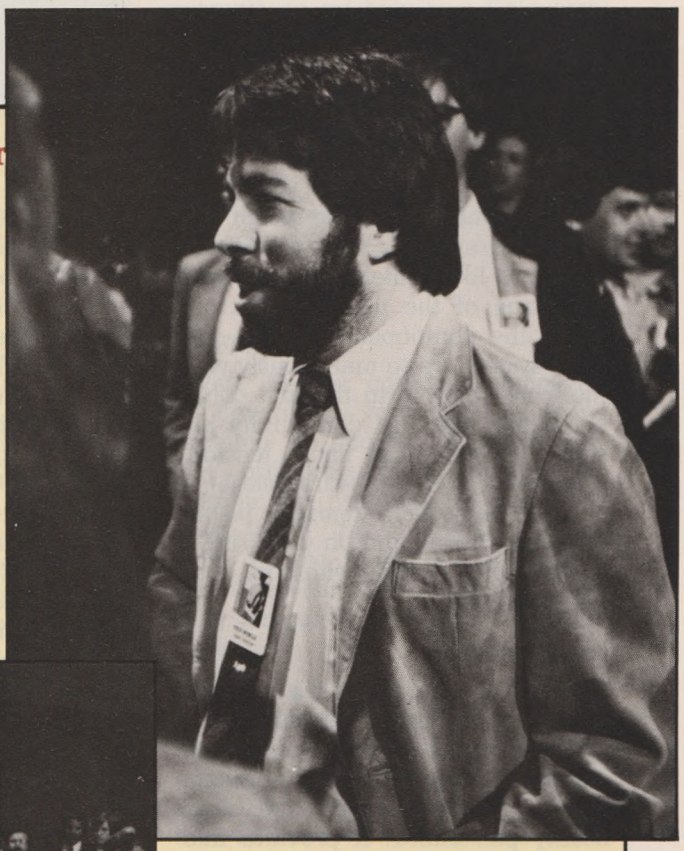
If someone asked me which machine to buy, I'd find it most difficult to answer. The best answer might be to buy both to take advantage of the unique characteristics of each machine. The IIc is an impressive machine in terms of what the designers have done to compress and even add features and enclose them in a briefcase-sized package. Apple tells us that this machine and the Macintosh will direct the fortunes of Apple Computer for the remainder of this decade. The one thing I will do is place my bets on Apple!■

*Address correspondence to Keith Thompson, c/o Microcomputing, 80 Pine St., Peterborough, NH 03458.*

ever Apple II Forever Apple II Forever Apple II For

dinner. After dinner, everyone returned to the Center for an evening of dance and drink with Herbie Hancock and his band. Robin Williams was a guest of Steve Jobs and circulated in the crowd.

This is "event marketing." John Scully predicts that this kind of event will set a new trend in the marketing of microcomputers. He predicts that doing business in Silicon Valley will never be the same again. If his claim that 50,000 IIcs were sold that day is correct, it was more than a modest success.



*Apple cofounder Steve Wozniak.*



*Apple Chairman Steve Jobs and President John Scully field questions from the media.*

# The Two Faces Of VisiOn

*VisiCorp's VisiOn represents integration that has never been seen before by IBM users; however, the system's complexities produce a sluggish performance.*

By Thomas Bonoma

Contemplating the results of VisiCorp's efforts with the VisiOn system is like contemplating the yin and yang of the mandala. On one hand, the components of this software system are so marvelously well-integrated they form the first coherent whole the IBM community has seen. On the other hand, tensions arise between the software's elegance and the consequent demands placed on the hardware and on you. VisiOn is constantly warring with both computer and user.

### An Adventure

VisiOn is a paradoxical adventure. It's the most integrated, command-consistent and easy-to-use software anyone could ever find. For some operations, its movements are sheer beauty personified. It provides integration simply unequaled in microcomputing history, with the possible exception of the Xerox Star System and the new Apple Macintosh. However, the software's complexity so far outweighs the significant capabilities of even the IBM XT that, as a whole, VisiOn runs with coughs and sputters.

To save those looking for the bottom line from unnecessary searching, here it is: Wait until IBM hardware is capable of running this complicated and well-designed system the way it should be run, or wait for a reconstituted version of VisiOn that operates in a faster manner on the XT. If you do buy VisiOn for your XT now, prepare for frustration while waiting for the system to execute commands and for sometimes boggy operation caused by system slowness.

VisiOn, in the form I received for review, consists of the following components:

- The VisiOn Mouse, adapter, metal grid for the mouse (it's an optical mouse) and cable for connecting to your existing RS-232C port;
- The VisiOn Applications Manager, a shell program under which all VisiOn applications (e.g., Write, Calc) run;
- VisiOn Calc, a spreadsheet program related to VisiCalc but significantly enhanced;
- VisiOn Graph, a program closely related to VisiTrend/Plot in operation, but again, significantly enhanced;
- Manuals for all of the above, each with a QuickStart guide, tutorial and reference section;
- A book called *VisiOn: The System, Its Concepts and Applications*, a nontechnical and nonprogramming introduction to the philosophy behind VisiOn and its general operation.

I hoped to review another software package, VisiOn Write, but it wasn't completed at writing time.

### See for Yourself

Photos 1–4 show various aspects of the VisiOn system in operation. Photo 1, for example, displays the system's capabilities for having different-sized and overlaid windows present simultaneously on the XT graphics screen. (Note the Services window in the upper right corner of the screen; it has been closed, and the label indicates that it's still there.)

Photo 2 shows multiple windows implementing, respectively, VisiOn Word (memo), VisiOn Calc, VisiOn Graph and a Services window managed by the VisiOn Applications Manager. Note the Applications Manager's menu underlying everything else at the bottom of the screen, and also notice the individual menus of the applications being pursued. Note also that one window, labeled Forecast, has a double line around it. It's the active window, the one being used at the moment.

Photo 3 shows a close-up of the VisiOn word processor and also gives a good indication of the screen resolution provided by the VisiOn system. Photos 4 and 5 do the same thing for the Calc and Graph windows, respectively. Note once more that in the last three photos, some closed windows are indicated at the top right of the graphics screen.

The VisiOn system requires an IBM XT computer with 512KB of main memory for operation. When installed, the Applications Manager and two applications consume almost 2MB of hard disk space. To be on the safe side, plan to allocate 4MB to current and future VisiOn applications, and also to your own data files.

Several printers and plotters are supported as well, but even users with fairly standard equipment, like the Prism printer, won't find drivers in this release of the software. The system's copy protection scheme leaves you dependent on inserting a

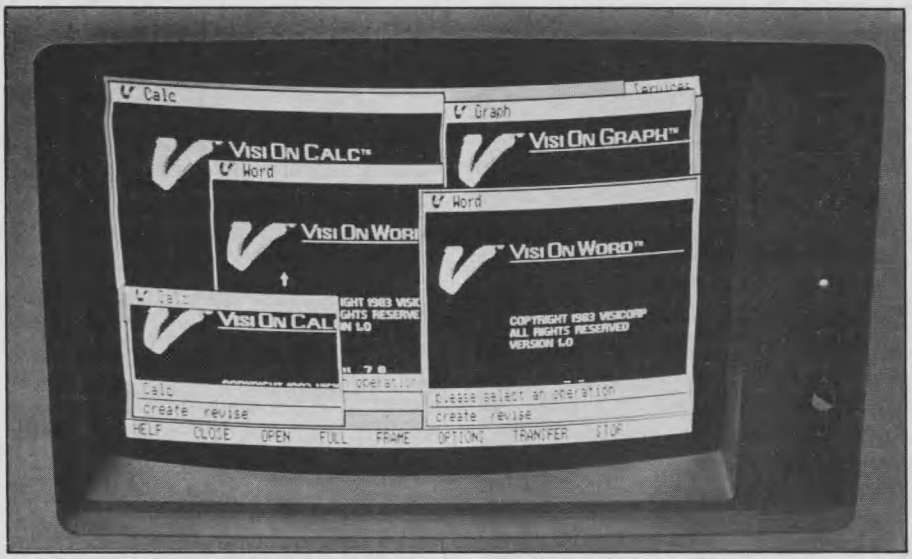



*Photo 1. The VisiOn multiple windows screen.*

"key" floppy in the disk drive each time you want to use VisiOn. If this disk isn't present or is damaged, goodbye system!

To understand the VisiOn system, it's first necessary to understand the way the VisiOn Applications Manager works. This program is the shell that underlies all VisiOn's applications. It's also useful to understand VisiOn's marvelous filing system and the unique windowing choice for display formatting that the system implements. Then, the applications portions of the system are easier to grasp since these aspects of VisiOn do not vary across applications.

### The Applications Manager

The VisiOn Applications Manager (APMAN) is the heart of the VisiOn system. It controls management of window placement on the PC screen, data transfers between VisiOn applications programs and other miscellaneous functions. APMAN's seven basic commands are available at all times.

Each time the VisiOn system is booted, you must calibrate the optical mouse by moving it around on its grid. This is a minor annoyance. APMAN then shows you a Services screen, from which you can start applications, install new applications or control certain utilities like the print spooler. Any number of applications can run simultaneously under the APMAN.

An application can be started more than once, in different windows, for different purposes. Thus, it's entirely possible to have a Write window and Calc window open at the same time and to choose two Graph windows as well (really two different and simultaneous runnings of the Graph program). The flexibility of this system is unlimited.

### Help Close By

Once an application or group of applications starts, APMAN underlays all applications windows on the screen and provides basic commands common to them all. APMAN's eight basic commands include a marvelous help facility that offers you aid in a manner similar to trunk-and-branch organizations of information. You can select general overviews of what you want to see or more detailed information on that topic or a related one, or you can just browse through the contents of the Help function at will.

A window, put up on the screen to display help information, is automatically removed by APMAN when you are done with the information. When you choose help from the APMAN menu, the program inquires which window you want information about and adjusts its display and contents accordingly.

Other APMAN commands include Open, Close, Full and Frame (window management commands). Open and Close cause placement or removal of a window on the video screen. Full allows you to work with one window in full-screen mode. Frame sets or resets the size of the window in question. The net effect of these commands is to give you a desktop on which pieces of paper (applications windows) can be opened, closed, overlaid, abutted and generally arranged in any way you wish. The final command, Stop, is used as a command interrupt key to abort commands in progress.

APMAN's commands work across all VisiOn program applications. For example, to get help in a Calc window, you move the mouse to the Applications menu and point to help. The primary interface between man and machine in VisiOn is the mouse, though two- or three-stroke keyboard commands are allowed. The Applications Manager is the primary interface between you and applications in VisiOn.

### No Flaws

The Transfer command manages the flow of data from one VisiOn application to another in a manner that's transparent to the operator. It's possible, for example, to point at a range from the spreadsheet, then point at the blank VisiOn Graph screen and have a bar chart automatically generated—with just that much work!

Similarly, you can point at data sets within the Graph program and transfer these to the Calc program for manipulation and analysis. While other applications weren't available at the time of the review, what was available worked well.

APMAN handles a pretty full range of transfers within VisiOn, with some restrictions. If you're working with dollars on the spreadsheet, APMAN loses that fact when the data is transferred to the graph program. It has to be reformatted to show again in dollars.

The Graph program doesn't transfer pictures to the Word program, a major shortcoming; only data series are transferred as text tables. But, with these restrictions, APMAN gives you as fully integrated a set of data transfer commands as has been experienced thus far in the microcomputing industry.

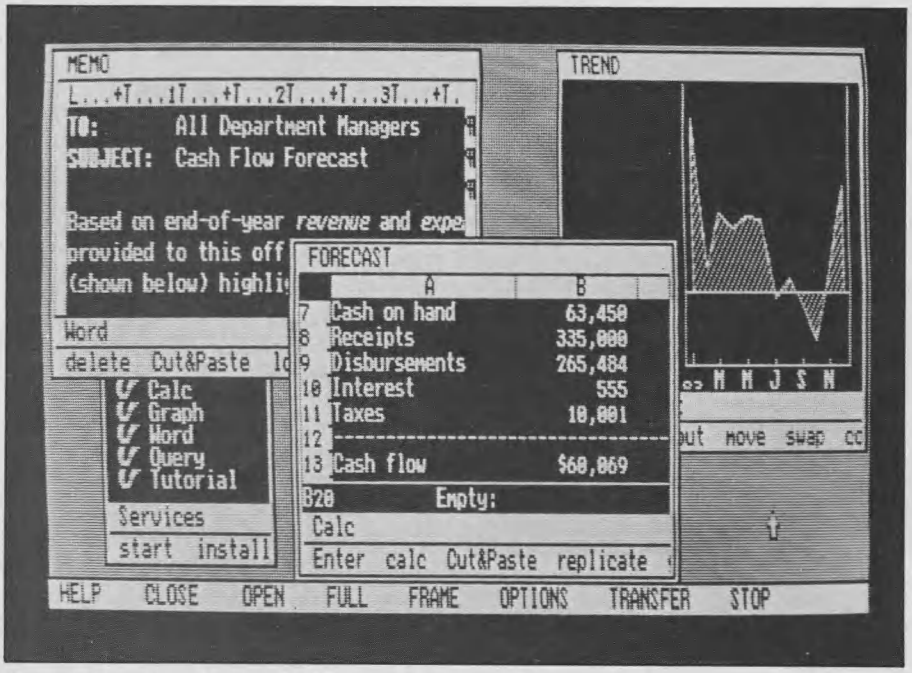



*Photo 2. A sample multiapplication screen.*

### Whoops...

In terms of data transfers from other software into the VisiOn system, APMAN clearly fails on importation and partially fails on exportation. The APMAN manual dismisses the transfer of information into the VisiOn system with the rather haughty quote, "You can create MS DOS files on another system and then use those files within the VisiOn environment. However, they must be in the VisiOn transfer format. Independent software vendors will be providing programs that create MS DOS files in that format." In other words? VisiOn can't make import transfers!

Regarding data exportation, the APMAN is somewhat more functional. By pointing with the mouse, then choosing to transfer out of VisiOn, you can create an MS DOS data file appropriate for loading with other programs. The bottom line in this revision is that VisiOn is a one-way system—don't plan on doing your work quickly with 1-2-3, then uploading to APMAN for fancier stuff.

### VisiOn's Filing System

VisiOn's filing system is a miracle of clever thought and good implementation. Essentially, the system is organized in terms of folders and documents where a central archive serves as a filing cabinet containing several folders. Each folder can contain many documents. When you delete a document, it isn't really deleted. Rather, it's put in a wastebasket folder, which holds it ready for recall until another document is deleted. VisiOn shows you what type of document is in each folder—worksheets, graphs and the like—in English!

Disk drives are mounted and unmounted, as in the old CP/M, from the Services window in APMAN to let the program get at different "file cabinets." The best part of this well-planned system is that once you have figured out how to use it in a single instance, you'll never need to learn it again. All of VisiOn's applications use this file interface. This means you need only to learn one filing system, and, if you choose, need only to have one gigantic file for all your spreadsheet, word processing and graphics files. The Applications Manager takes care of everything else.

However, the folder and document system allows you to be as sophisticated as you'd like in setting up different folders and multiple documents within folders as a filing scheme. The system has clear and simple provisions for transferring data between folders, backing up files and folders and, generally, for doing just about anything you might like with files with clarity and simplicity.

### Windows?

The Applications Manager is definitely a programming and design *tour de force.* However, the question arises as to whether you need a windowing scheme in which windows can overlay one another like pieces of paper on a desktop. Is it enough to have windows that tile? In a tiling system, the windows can butt one another and even be of different sizes, but one window can't overlay another. The VisiOn approach clearly is the more flexible, elegant and sophisticated. It's also slower because of all the video and logic management that must go on to make it work. In light of the fact that my primary criticism of VisiOn is its lack of speed, I'd prefer a simpler tiling scheme to the more flexible windowing system if it added a significant amount of speed to the running of applications.

### VisiOn Calc

The Calc program is an extremely flexible one that handles text and numbers in a good fashion. Typeover labels, named ranges and a number of other features make the spreadsheet exceptionally flexible for most operations.

VisiOn Calc handles spreadsheets of up to 511 rows and 128 columns, a size adequate for almost any applications task. When the program is called up, you must specify whether you are creating or revising a worksheet—that is, whether a new or old worksheet is going to be the subject of operations. The program is run from a set of command menus that are more extensive than those in the original VisiCalc. It's supported as well by a set of options sheets that operate as pop-up menus to allow you to change certain features of Calc's operations.

Calc's basic commands, displayed in a main menu and accessed either by mouse or keyboard (if preceded by a control key, like escape), are the following. Enter allows information entry, cell editing, blanking, copying and format setting for cells and ranges of cells. Calc recalculates the worksheet in manual recalculation mode, and Cut and Paste changes the structure of a worksheet by allowing column insertions, deletions, copying, sorting and consolidating of the

information on one or more worksheets.

The Replicate command copies the contents of one or more cells on the worksheet into another area of that worksheet. Goto is a direct cursor-jump command; Display controls how an entire worksheet displays. This command controls column width (individually adjustable), title fixing and windowing of the worksheet. Attrib controls the display of the information on the worksheet itself. You can set formatting characteristics, like alignment, specify label-only (or numbers-only) cells, place decimals and even limit the highest and lowest values that may be input for each cell, for ranges or for the entire worksheet. The File command handles worksheet storage and retrieval, while the Print command produces worksheet hard copy as specified.

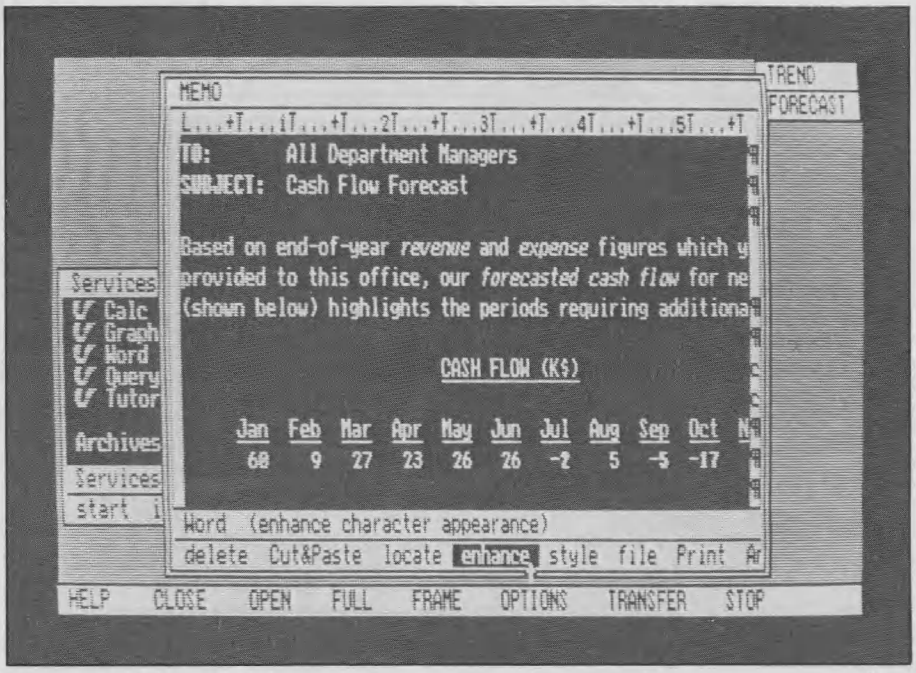



*Photo 3. A close-up of the VisiOn Word screen.*

Several of these main menu commands have pop-up option sheets that can be called by mouse-pointing to options on the Applications Manager's menu. If this is done for Attrib, you are faced with an overlaid window on the Calc screen that offers choices for the display format (as is, decimal, thousands, millions or scientific display), decimal placement (floating or from zero to six decimal places), alignment of values and numbers (left, center, right, separately adjustable), special formats (floating dollar signs, fixed dollar signs, trailing dollar signs, percentage signs), tab stop settings, restricting the data type allowed in the cell (formulas, numbers, labels or none), making the cell contents invisible, protecting the cells and limiting the upper and lower boundaries of data that may be input to the cell.

These choices can be made at will for any cell, a range of cells or the entire worksheet. In general, Calc gives you an impressive array of options. The options windows and the excellent way that Calc translates the choices into clear menus keep them from becoming overwhelming.

The function set in Calc is a reasonably complete one that is adequate regarding statistical functions (e.g., sort, max), good in terms of logic and look-up functions, strong in terms of commonly needed financial functions, like internal rate of return, and equipped with the data functions that allow these or other computations to be tied to time. A Sort command gives good control over entry ordering, while Calc's windowing capabilities mean that split-window worksheets are possible.

Consolidation of values across worksheets is supported by the program, though arithmetical consolidation (e.g., adding two worksheets together) is not supported directly. Fetched range-names can be used in formulas to accomplish the same function.

An interesting feature of Calc is that it's as comfortable printing to a plotter as it is to the printer. Though the Calc program, and VisiOn overall, make only weak use of the HP plotter's text capabilities, the result is still a fairly professional-looking spreadsheet when output is sent to the plot device.

### Love and Hate

In operation, the Calc program generates the same love/hate feelings that the rest of VisiOn brings to the surface. The options sheet, for example, allows quick and easy formatting. Formulas can even be entered with the mouse, by pecking at a menu of operators (parentheses and the like) displayed when the formulas are entered. Calc is a program in which you can do almost everything with the mouse and never have to worry about your typing skills. Screen scrolling, usually a problem in spreadsheets, is done simply by clicking the mouse and dragging the screen to where you want it. Though slow, this process beats cursor keys for movement because mouse manipulations quickly become natural.

Yet, in everything it does, Calc is incredibly busy. So much is going on when even simple screen scrolling occurs that the machine is clearly struggling with the complexities of menus, option windows partially overlaying the Calc window, clever graphics shading of rows marked and the like—the result is sluggish. That's almost intolerable when work of substance is being attempted.

The sluggishness isn't necessarily due to any suboptimized coding—rather, the program is just trying to do so much to make life easy for you that sometimes nothing much gets done. I found myself repeatedly giving up in frustration on Calc, even when trying to evaluate it.

After all, contemplating the elegance of what is going on is one thing; getting work done is another altogether. While Calc is going out to disk to do whatever it's doing, or even when it's implementing a menu choice, the Applications Manager

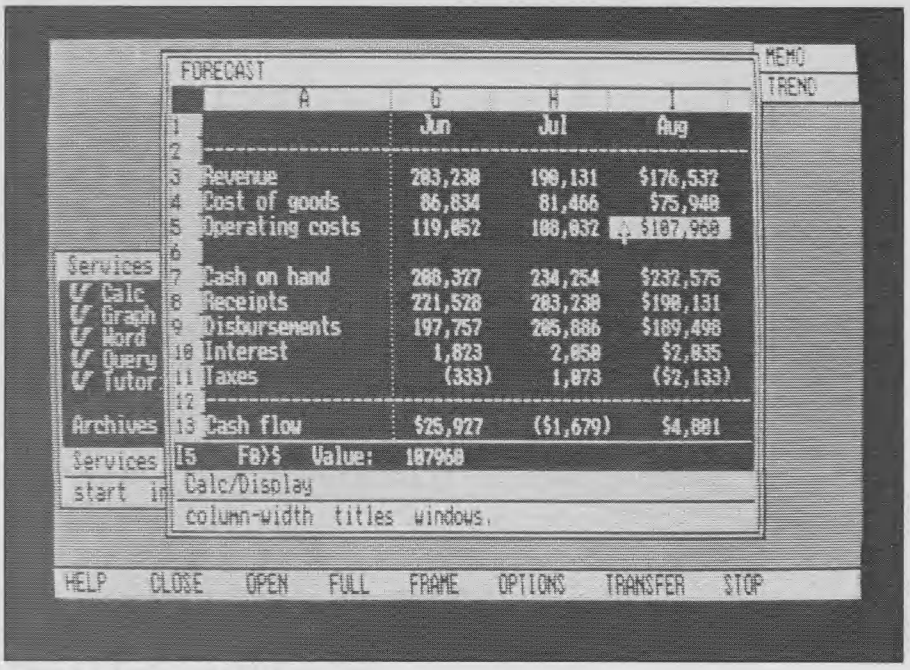



*Photo 4. A close-up of the Calc screen.*

temporarily replaces the mouse cursor with an hourglass-like "not available" symbol to indicate that the program is busy. This symbol appears much more often than it should, and worse, the program often cheats by replacing the not available indicator with the ready arrow when the program is by no means ready to accept further commands.

Perhaps the VisiOn people thought you wouldn't notice—you will, and it's frustrating to wait for the program to catch up with your thinking.

### Mouse Bane

VisiOn's mouse interaction device is, at the same time, a virtuoso of simple interaction and the bane of the program's existence. It's a virtuoso because it's so easy to point to this cell or that, to scroll the screen by mouse-pointing and to do many other things, including entering formulas. Conversely, it's the bane of existence because VisiOn uses menus at every turn in the Calc program (and in the system in general), and it quickly gets tedious having to point to two or three different menu choices before you can accomplish a simple action like blanking a single cell.

Worse, since the VisiOn system uses a virtual file on disk for dumping the spreadsheet, you're faced with relatively long waits (as much as one second) at every mouse-point while the system goes out to disk either for more spreadsheet data (while scrolling) or for a different program segment. The resulting feeling, which grows with VisiOn experience, is one of terrible impatience while you wait for the mouse cursor to come back from its inactive state after a choice is made, for the disk to stop spinning or for something to get done so that work can go on. The combination of numerous menus, multiple pointings per menu choice and disk spill creates a system where your thoughts can outrun the software and machine's capabilities, even when you're attempting simple actions.

Literally everything in VisiOn is done from menus at the bottom of the screen (Applications Manager), from others put up by the program itself (application) or from still others put up on special options windows that overlay the worksheet in question. For instance, with a simple point-and-click, the format of a given range of values can be changed from percentage to numeric or to any other format that might need to be displayed. Yet use of the mouse for all these functions, coupled with the machine's slowness, breeds a feeling of tedium and makes experts wish for the simpler vanilla VisiCalc days of typing a slash and a single letter for a quick response, instead of either being held at mouse-point or being captive to escape-shift control characters.

There are some bugs in Calc, but in general, Calc and the entire VisiOn system is clean. The problems, though minor, can be frustrating. For instance, if printing is in progress, text put onto the worksheet is put everywhere but where you've picked. Ask to go to a given cell or to do many other things and printing stops cold until the manipulation is made. When printing comes back, everything else is even slower and busier than before. The hardware simply can't handle what's being asked of it.

Bottom line: VisiOn Calc is a good spreadsheet that handles all that's asked of it functionally speaking, but in operation, it winds up frustrating you by making you wait while it tries to get its act together.

### VisiOn Graph

In many ways, the VisiOn Graph application is the star of the VisiOn system. Slowness does not impede Graph use in the same way it does when Calc is used because the system is working with window-sized chunks of information and translating numbers to pictures. If you buy into the basic philosophy of the Graph system, it's a highly flexible and even (for VisiOn) rapid response unit.

By basic philosophy I mean the way that VisiOn understands data input for graphing. Essentially, Graph is a time series analyzer, which means that the system is set up to handle, to expect and to work best with Euclidean data that has as one axis of reference some relationship to time. Given data that conforms to this format, the program is a genius of automation and clear functioning.

For other kinds of data, say one-axis data that doesn't reference time but, say, categories, Graph is much less well-suited. For example, given sales for 1981, 1982 and 1983 in dollars, Graph handles these as it was designed to. Given the same dollars, though, for marketing, production and general administration categories in a single year, the program must be force fit to generate meaningful graphs. The point isn't that Graph won't handle such nontime-oriented data sets; the point is, rather, that like VisiTrend/Plot, the program works best with and was designed to operate on time series data. If you don't operate with time data as the

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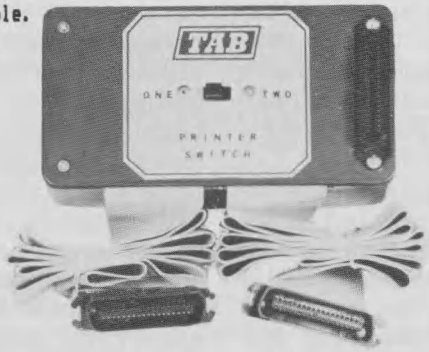
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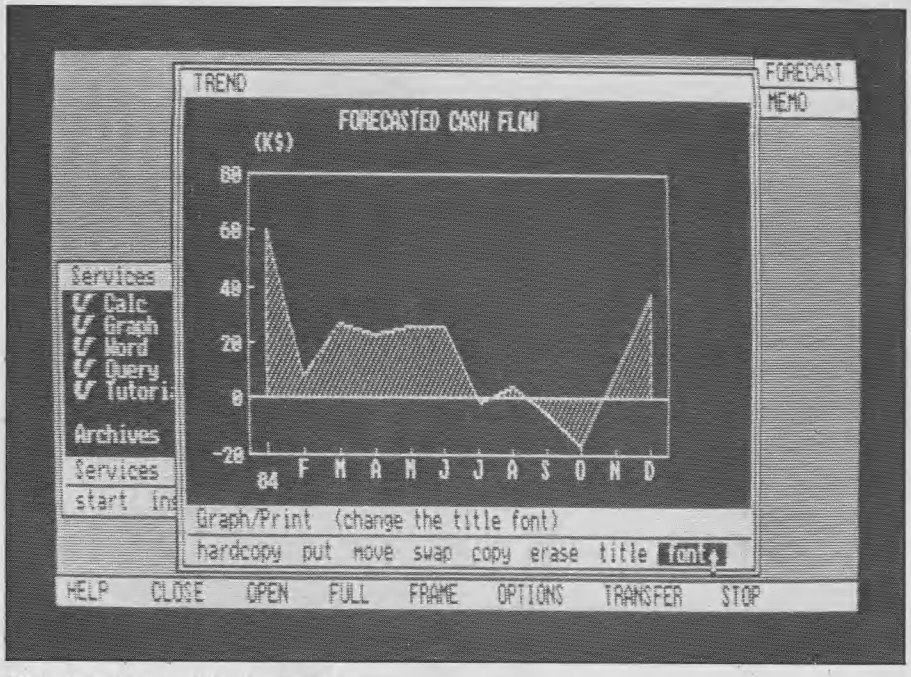



*Photo 5. A close-up of the Graph screen.*

majority of your pictorial analysis needs, you'll find Graph less well-suited to your applications.

The basic unit of graphic analysis in Graph is the data series, a single set of numbers that is implicitly presumed to have some relationship to and change over the passage of time—for example, monthly, quarterly or annual sales figures.

VisiOn accepts, stores and manipulates these series in quick order. As with all VisiOn applications, data series and the graphs that result from them are storable in the archives.

The two basic operations in setting up a VisiOn graph are entering the data and specifying the data's relationship to time.

VisiOn has many automatic or semiautomatic presumptions built into its time structure. For example, if you start with January 1981, and assume each measure thereafter is one business quarter, the program can handle this semiautomatically when initial periods are chosen, and Graph is as happy with weeks, days, years and other regularly occurring time units as it is quarters.

The Graph edit screen, where series are input either manually or in a transfer from a Calc worksheet, allows a number of data manipulations to be performed on entered data. For example, there is a command that interpolates a series, creating it between an arbitrary start and end point, to produce an arithmetic series, (e.g., 1, 3, 5, 7, 9...), or a geometric series (e.g., 1, 2, 4, 8, 16, 32...). The editing screen is simplicity itself, despite these advanced commands. It retains the basic point-and-click philosophy underlying all VisiOn applications.

### Current Choices

Once data has been entered as a series in Graph, you have a number of choices concerning the type of graph you create. Currently implemented types include line, area and bar graphs (both stacked and comparative), pie graphs, hi-lo-close charts (using three series for the high, low and closing stock prices, respectively), and x,y graphs (using two series, one for x and one for y values).

Data that is unrelated to time can also be plotted by specifying a periodicity of one. Though the displayed graphs are in black and white—or rather, in grays—the program performs complex shadings so color isn't needed. Graph and all of VisiOn operates on the high-resolution graphics screen of the IBM PC.

Fig. 1 gives a sample of two different Graph charts generated on an Epson FX-80 printer. The first is a relatively simple bar chart. The second is a test of whether the VisiOn graphics editor is capable of producing text charts suitable for presentation.

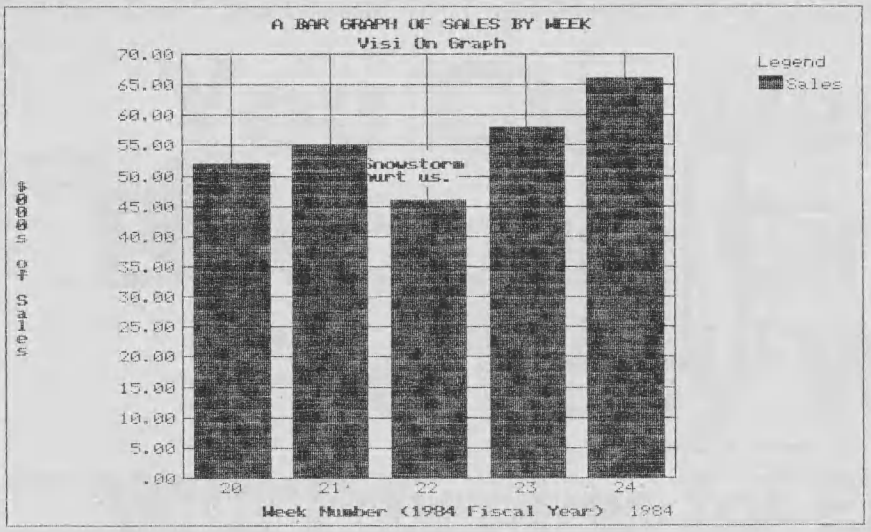
Fig. 2 shows four more graphs from VisiOn Graph, generated on an HP 7470A plotter. The first is a comparative bar graph; the second, a pie graph (percentages were generated automatically by the VisiOn graph program); the third, an area chart; and the fourth, an abortive attempt at a text chart or slide.

As you can see from the figures, VisiOn Graph produces impressive graphics output given the right peripherals.

Once a basic graph type is chosen and data input, you can enhance the resulting picture with some of Graph's optional commands. Regarding text labels, the program can add titles and text to graphs in two (roman and boldface) fonts. A nice text placement, movement and editing facility allows horizontal or vertical text to be placed anywhere on the graph, moved about and generally manipulated so as to dress up even the most drab data in a useful way. While this text editor is line-oriented and only works with entire line-blocks of text, it's suitable for most needs.

Another set of options available on the graphics options window lets you choose whether graphics will be automatically redrawn when anything is changed that impacts them, or changed manually. The latter mode is much quicker, of course, because batch changes are made to the picture before it's redrawn in final form. Legends are added or removed from the graph automatically, as are axis labels. Shading can be chosen from the same menu, and Graph plots in black on white as well as in white on black. Finally, horizontal, vertical or joint grids may be overlaid on the picture that's generated.

A unique feature of Graph is that it lets you change the scale (height or width) of the displayed graph. Either the x-axis, the y-axis or both may be rescaled to zoom the graph on particular subsets of the displayed data, to change the relationships between the height and width of the displayed data (for example, to enhance or minimize a particular hump in a curve) and, generally, in any way you choose. Anyone who needs to create a picture and then spend some time deciding how to fine tune it for maximum visual impact will appreciate this feature.




VISI ON GRAPH'S TEXT AND CHARTING ABILITIES

VOG can generate line, bar, pie, x-y, and hi-lo-close graphs, in addition to text charts like this one (two fonts available).

The program is tailored to time-series analysis, or working with data that vary over days, weeks, months or years. It is somewhat cumbersome with data that do not have time as one major axis, like it's cousin VisiTrend/Plot.

The program does what it does very, very nicely, though. When its not going out to the hard disk to muck around with some window or other, it works quickly and well. Graph overlays are supported, for example, as is wide-ranging text addition to existing graphs.

The nicest feature of the program has to be its ability to accept data from Visi On Calc, other Visi On applications, or even another graphics window, and to transmit data back to these applications.

T. Bonoma, 3/84

*Fig. 1. VisiOn Graph hard copy output—Epson FX-80.*

Graph has good facilities for printing the data series associated with a particular graph or for outputting it to a printer or plotter. Printed graphs can be previewed on the screen in exactly the same proportions they'll take when printed on paper, a major benefit.

Printed pages can be divided into two (vertical or horizontal) or four (quadrants) sections and up to four different graphs can be placed on the paper for multiple graph printing. Main, sub- and bottom titles can be added to the page that's created, allowing consistency of headers and footers (even page numbers) for insertion of a graph into a report. Single or partitioned pages can be printed in any size by varying the print-time length and width parameters offered on the options sheet.

### Black Magic

The most powerful function of Graph, despite all the features mentioned above, is its ability to transfer data from the Calc sheet to the Graph program for plotting. This is done in two ways; one might be called traditional but impressive and the other must be termed pure black magic.

The traditional transfer method involves specifying a block in a Calc worksheet and transferring that block as one or more data series to the edit screen of the Graph program. The black magic method involves specifying a similar Calc window block, and then simply pointing to the blank graph screen (not the data one). A bar chart is drawn before your very eyes. It's hard to overstate the impressiveness of this second method; data goes from simple spreadsheet appearance to a finished bar chart with no intervention. It's an impressive capability.

Graph is a thoughtfully designed and well-implemented program that handles time-series data excellently, other numeric data fairly well and textual chart creation poorly (the type sizes available for output are simply too small to produce readable presentation-quality text graphics).

The ability to transfer spreadsheet data from a Calc window to the graphics screen is valuable. The fact

You'll react to the mouse in one of two ways. Generally, the less able you are as a typist, the more you will welcome mouse technology.

that data series can be retransferred to the Calc window is equally welcome. The transfer function, however, suffers from many shortcomings. Dollar signs and other format modifiers on the spreadsheet are dropped when transfers are made. Also, there's currently no way to transfer a graph to print in a word processing document, a capability possessed by even some lower-aspiring systems like pfs:Write. However, these complaints notwithstanding, Graph rightly claims true integration with other parts of the VisiOn system, adequate integration with other VisiCorp products, like VisiTrend/Plot (a utility is provided for translating VisiTrend data series to VisiOn Graph) and no integration at all with other applications that don't run under the VisiOn system (like dBase II or 1-2-3).

### Other Points

VisiOn's documentation, from the paperback book to the good manuals with their QuickStart courses and reference guides, are clear, well-done and useful guides to the software package. The disk-based tutorial supplied with the system is also done well and represents a good introduction to the ins and outs of the entire system. Even though they've provided disk-based instructions and QuickStart guides, the VisiOn developers took pains with the manuals. They are clearly written with liberal examples and generally are a testament to the thoughtfulness that went into the development of this system. The novice, even one who has only some familiarity with the IBM XT computer, will have no trouble becoming competent on the VisiOn system.

You'll react to the mouse in one of

Most of us are terribly unwilling (and rightfully so) to give up speed for integration; we want both, and won't trade either.

two ways. Generally, the less able you are as a typist, the more you will welcome mouse technology. VisiOn seems to be designed for the manager or knowledge worker, a person perhaps more comfortable with delegating typing tasks than with interacting with machines directly. For this individual, the ability to do almost everything in VisiOn with the mouse is a real benefit.

For others, or for the knowledge worker who becomes better at interacting with the IBM XT, the mouse may impose a degree of frustration on system operation. You are constantly pointing at one menu choice or another while operating VisiOn. There are few shortcuts for experts (like the functions keys) and little the intermediate user can do to speed system operation.

A related issue is the plethora of menus. Though they are welcome and a real human interface to VisiOn's complexity, the menu choices often get in the way of rapid system operation. There's no way to avoid them unless you're willing to tolerate a relatively cumbersome series of escape-plus-letter-key or shift-plus-letter-key combinations in order to do the job at the keyboard.

Even this doesn't help much, because the system operation is slowed more by the waiting time between choosing a command and executing it than it is by the number of keystrokes or mouse use that must be employed to choose the command.

Finally, and to VisiOn's credit, the constant operation of the program on the high-resolution graphics screen doesn't become tedious, result in unnecessarily fuzzy characters (at least on an RGB monitor) or in other ways

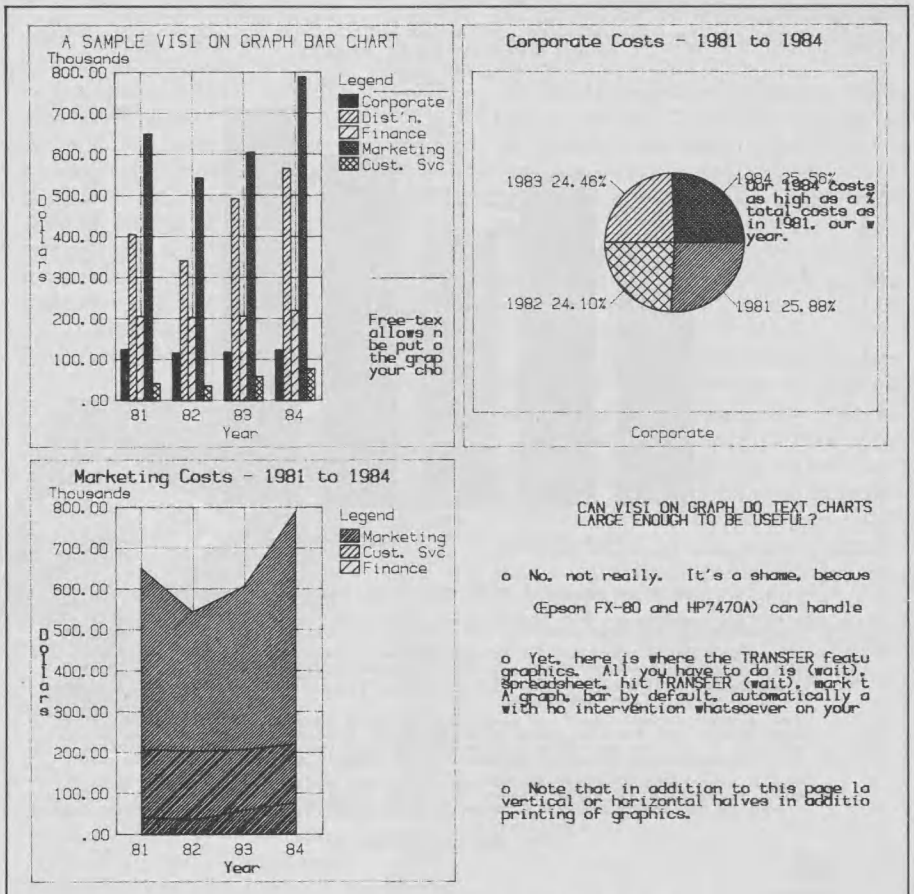



*Fig. 2. VisiOn Graph hard copy output—HP7470A plotter.*

impact you negatively. The graphics produced by the system are superbly done, whether simple Calc windows or full-blown graphs. The developers must be proud of the graphics interface.

## The Vision of VisiOn

If you were trying to develop integrated software in 1982 and had high aspirations as well as a blank check, VisiOn would be the system you'd have designed. At that point, the notion of windowing without high speed, versus tiling with it, hadn't been seriously considered. No program talked to any other very well, and the goal of integration seemed elusive. Most importantly, it wasn't clear how unreasonable users were going to be about having in one package.

1. compatibility with other DOS applications,
2. no speed decrement with increasing integration of modules,
3. a wide variety of applications that all talked to one another and
4. the ability to choose color displays if the expense of an RGB monitor and color card were to be incurred.

More importantly, it wasn't clear just how little would be asked of the operator, and how (mouse, keyboard or digitizer) the information would be transferred from the human finger onto the computer screen.

In retrospect, VisiOn had bad vision about several of these important topics, and their resolution changed over the year-and-a-half the product was in development. For instance, most of us are terribly unwilling (and rightly so) to give up speed for integration; we want both, and won't trade either.

The relatively poor reception of the first truly integrated package on the market, The MBA, is a testament to this fact. The MBA betrays a second nonnegotiable demand: Don't use operating systems or internal operating systems that won't allow communications with the installed software base that's already been heavily invested in. Right now, VisiOn doesn't talk with any nonVisiOn applications,

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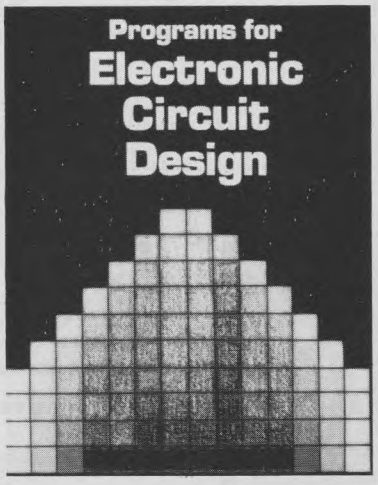
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except its close cousins, VisiWord, VisiTrend/Plot and VisiCalc. That's just bad judgement and a wrong guess.

### Bogs Down

Moreover, it was probably unclear to VisiOn's designers when the paper design of the system was engaged just how far the new XT hardware could be pushed if all the tricks were dumped out of the bag during coding. Like Microsoft Word, which also is a complex graphics program that runs on the IBM PC or XT, what VisiOn asks of the IBM's data storage, processing and graphics display abilities in many ways outstrips the ability of the machine to answer these needs. It's astounding that a package that runs only on a hard disk and occupies more than half a megabyte of memory could be called turgid and busy, but that's how VisiOn often operates. The system in its totality, with its multiple windows, multiple concurrent applications and other features, makes demands that the XT cannot fulfill in rapid fashion. The overall result is noticeably sluggish.

It's important to remember that I've evaluated version 1.0 of the VisiOn system

The issue of how many menus and what interaction scheme best serve users over their learning life cycle still remains unresolved and is subject to personal tastes. For some of you, the multiple menus in VisiOn will be a godsend throughout your personal computing career. For others, these programming strengths will become the major weaknesses that cause this expensive software system to be abandoned for the old combinations of 1-2-3, VolksWriter and dBase. If I were to make the choice right now, not having seen the VisiOn Word program, it would be the latter.

Finally, it's important to remember that I've evaluated version 1.0 of the VisiOn system without a very important component: the VisiOn Word program. It remains to be seen what improvements can be made in speed, in uncluttering the system and in making it less busy. Perhaps we have all we're going to get in these realms. Even if that fact is true, the system can still be made much more compatible with other programs, so that VisiCorp isn't put in the intensely uncomfortable position of denying that a program like 1-2-3 exists. That particular revision seems a necessity, not an option.■

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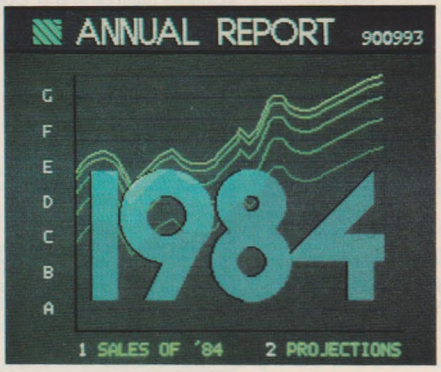
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By Eric Grevstad, Senior Writer

# North of ASCII:






# Canada's Videotex Standard

Canadian hotel lobbies aren't your living room, but they're not the World of Tomorrow either. The concept of videotex, two-way graphic telecommunications, has had a sort of George Jetson Picturephone image. Until lately, it's been hard to find an article on the subject that didn't predict Yellow Pages and Sears catalogs on everyone's TV set by next summer.

The truth about videotex is short of that and north of the border; it's in Canada, where information stands in hotel lobbies are the first sign of what might be called videotex's second coming—which is both more realistic and more exciting than those initial wild predictions.

There are two things to say about videotex. One is that a great many talented people and companies, not to mention the Canadian government, have spent years of work and millions of dollars on a product you've shown little or no interest in buying. At this writing, except for 1000 test families in Florida, no American household has the graphic news, educational or shop-at-home services that sages of the 1970's expected to become commonplace.

It's starting to look as though that may change—indeed, those firms that have hung on through the long delay are poised for a boom comparable to the introduction of television itself. But there's no denying that two-way TV has been an extremely slow starter.

The second, more important, point about videotex is the reason it may finally succeed. Almost ten years' tinkering with standards has produced an amazingly efficient protocol for transmitting graphics and text—in effect, a new ASCII, ready to replace the familiar American Standard Code for Information Interchange used to trade information between computers.

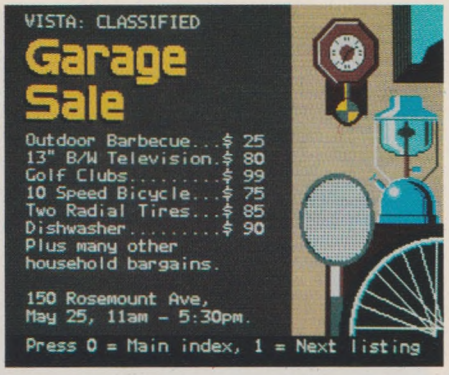
The new standard is the North American Presentation Level Protocol Syntax, NAPLPS, settled in virtually final form last November by the American National Standards Institute (ANSI) and the Canadian Standards Association. Besides rallying the cause of videotex, NAPLPS is already changing the world of micros. To quote Herbert Bown, who helped develop the system at Canada's Communications Research Centre (CRC), "We had Morse Code, then we had Baudot for uppercase text, then ASCII, and now we have NAPLPS. [Today] machines have ASCII built in; the next personal computers will have NAPLPS built in."

### The British, French and Canadian War

Before it was pronounced "naplips," the protocol was pronounced "Telidon." NAPLPS grew out of Canada's campaign to rival Britain and France in establishing videotex standards in the mid-'70s, when people thought two-way TV was just around the corner.

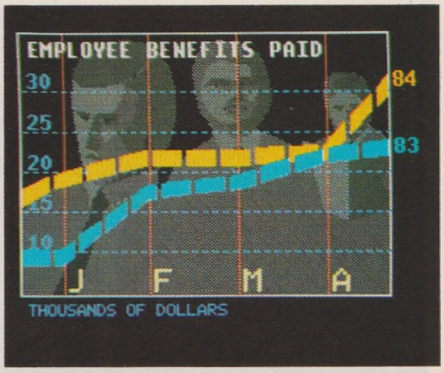
England's standard, Prestel, was developed by the British Post Office (now British Telecom); a similar system, Antiope, soon followed in France. Both are alphamosaic systems, combining 40-column ASCII text with pictures made of mosaic blocks—the various combinations of symbols formed by six squares in a rectangular matrix, three squares high and two wide. (Radio Shack fans will recognize this as the graphics character set of TRS-80 Model I/III/4 micros.)

Prestel hasn't swept British households, partly because mosaic pictures are crummy compared to bit-mapped or pixel graphics (compare TRS-80 and Apple games), and partly because much of its content is available in cheaper teletext services supplied by the BBC and independent stations. (Two-way videotex involves material sent over phone lines to a terminal with video screen; teletext is broadcast one way by TV antennas and received by a box attached to the set. Viewers use menus and buttons to decide which screens of information they want to see, but can't send mail or go shopping.)









Like its competitors, Canada's first videotex proposal—Telidon—was launched at both public and private expense. Philip Kinsman, the Department of Communications' director of public affairs, counts $67 million in government and $300 million in industry investment from when initial research began in 1978 until March 1985, when federal subsidy will end. Unlike Prestel, Telidon isn't alphamosaic but alphageometric. Instead of building circles out of squares, it draws circles compass-fashion, around two points that define a diameter.

Besides ASCII and alphamosaic character sets and color information, the CRC scheme includes picture description instructions (PDIs) for "geometric primitives," such as points, lines and rectangles (see sidebar). By abbreviating a triangle, say, to its three points, Telidon can transmit in a few bytes what took dozens of mosaic commands—and, since videotex is sent over regular lines at 1200 bps, provide better-quality graphics in a fraction of the connection time. Between bit-mapped pictures and lower phone bills, potential videotex suppliers took notice.

"About three years ago, CBS was about to go to the French," Kinsman recalls. "The French said, nobody wants graphics, and if you do, you can use DRCS [dynamically redefinable character sets, a feature that lets videotex providers customize their fonts as dot-matrix printer owners do].

"We showed them a graphic we thought they might want to use, the CBS eye. In Telidon, it took 54 bytes. The French took 1700."

### Cost and Commercialism

Transmission economy is appealing, but not the real reason Telidon, after various versions and near-adoption by AT&T—which took an enhanced version as its Presentation Level Protocol (PLP) in 1981—emerged triumphant as the North American standard. (The November 1983 NAPLPS is an updated, more clearly defined Telidon; the latter word has become a certification mark of the Canadian government for products which meet NAPLPS requirements.)

In fact, NAPLPS has some disadvantages. It adapts more easily to different machines than Prestel but needs more careful transmission. Peter Jordan, president of Ottawa's Microstar, Inc., and designer of a NAPLPS decoder for the IBM PC, says, "NAPLPS' weakest point is that it's very susceptible to errors; one error in the middle of the page and it's garbage."

Also, NAPLPS requires more processing power on the receiving end. Keith Chang, the Department of Communications' manager of industrial applications, estimates that "the total RAM requirement for a [full-function] NAPLPS decoder is between 32KB and 48KB." That's nothing to today's microcomputers, but in Telidon's infancy RAM was expensive and microcomputers didn't exist.

Until very recently, terminals made by loyal Telidon supporters like Norpak Inc., were bulky metal boxes that attached to a TV set and cost $2000 or more. Nothing that size or price is going to become a household appliance; only now are there terminals like AT&T's cordless, paperback-sized Sceptre, offered for $600 to participants in Knight-Ridder's Viewtron videotex service in southern Florida—and guesses as to how much a Sceptre actually costs AT&T range up to $2300.

"The [terminals] we're getting now are handmade," admits videotex consultant David Carlisle. "There're discrete components; there's no large-scale integration. There'll be [mass-produced] terminals, but [manufacturers have] been waiting for a standard, and March 1984 was the first time you could buy a terminal to the standard."

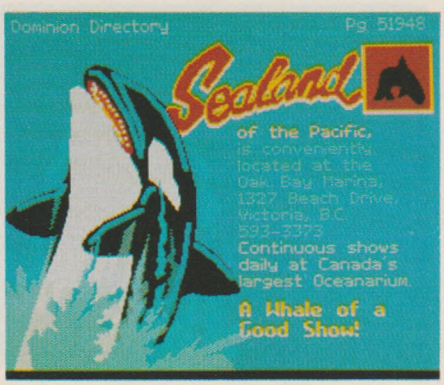
Agrees Chang, "To talk low price, we'll have to talk VLSI chips in decoders, and that'll be another six months or so." AT&T and Canadian TV manufacturer Electrohome are making consumer terminals now; one NAPLPS watcher in Toronto claims Sony is working on "a sexy little decoder" as part of its Profeel line.

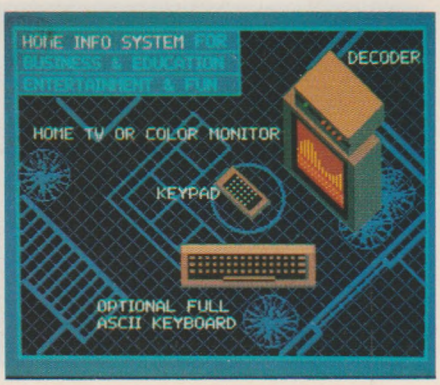
Equipment cost and slow adoption of standards, then, have kept videotex in a vicious circle; in Carlisle's words, "It was a hell of a process; it took two years longer than most people thought it would. AT&T announced in May 1981 that they were going to support the new standard, and it wasn't ratified 'till November 1983. That's two and a half years during which videotex essentially stood still."

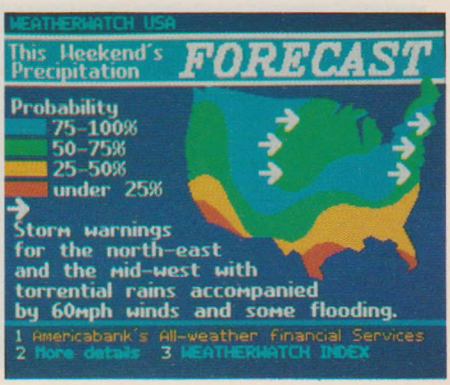
But what finally broke the deadlock was NAPLPS' graphics. Subscribers pay only a fraction of what an information provider needs to maintain a database of videotex pages; advertising pays the rest. And, Toronto ad agency head Doug Peter remarks, "We don't believe people read TV sets."

"You can't have good advertising on an ASCII-based service," declares Infomart Marketing Director Thomas Ward. "At least the ad agencies and marketing people don't think you can, and they're the people who are going to pay for the service."

"Nobody ever said the consumer is going to pay more for color and graphics," Carlisle agrees. "The IPs



[information providers] are the people behind it, and they're the ones who will pay a hell of a lot more for color and graphics. Exxon sponsors the stock prices on the Chicago Board of Trade; they're not going to pay $10,000 a month for ASCII."

As for Prestel, says Don Fenn of Videopress Inc., which supplies touch-screen information kiosks for shopping malls, "An advertiser won't buy a [mosaic] system. I can't sell a Pontiac J2000 using little blocks."

### Business Success Stories

Reviewing the years before NAPLPS became standard, Norpak's Barry Grace understates things: "The market has been developing a little bit slower than any of us envisaged." The November standard was a long-awaited boost; February's announcement of a joint project among IBM, CBS and Sears for home videotex was another ("It's significant in that it lends credibility across the whole field," Chang says).

But the big three's service isn't expected until 1896, and other home-oriented ventures may wait for it to break the ice. Meanwhile, Norpak President Mark Norton says, "We feel there will be a consumer videotex market, but it will be preceded by a commercial videotex market. If you're running a business, the value of that service [overcomes] the cost of the terminal."

Bottom-line thinking, as opposed to living-room fantasies, underlines the three biggest success stories in videotex to date. Rather than creating and storing graphics pages, Toronto's Marketfax InfoServices offers raw data—the last 100 days, weeks or months of all trades on the New York, American, Toronto and Vancouver stock exchanges—graphed on the fly, as subscribers ask for plots of various stocks over various periods. When you add information from Canada's statistics bureau, you have an infinite combination of charts and figures, ordered with typed commands like "Add LRP Retail to 86" (from an existing graph, superimpose a linear regression analysis of retail sales through 1986).

Marketfax's speed and versatility is amazing, but President John McLauchlan downplays its technical aspects; "Telidon is nothing more or less than an economical graphics communication technique. That's all it is. Two-way TV? What is that? Nothing.

> "There are all these Apple and IBM and Tandy machines out there just crying for things they can do."

"I don't go out and sell any NAPLPS applications. I'm selling Marketfax. I'm selling information, and the client doesn't care whether it's NAPLPS or whatever format. I am using a protocol that I feel is the very best for providing this service; it just happens to be NAPLPS."

Marketfax isn't cheap—$350 a month for up to 12 hours of connect time, $600 for 12 to 20 hours, and so on, plus the cost of the terminal—but, McLauchlan says, it leaves other data banks and graphics programs in the dust: "With PCs you have to call up The Source or Dow Jones, call up the data, save it on disk and plug it into the application. I mean, there's the Pinto and there's the Cadillac. These guys are trading hundreds of millions of dollars; they want to hit a button and have information."

Toronto's Infomart, perhaps Canada's leading information provider, found two other market niches to offset the high cost of equipment: the firm's Teleguide division runs 500 stand-alone public access terminals in Toronto shopping centers and hotels, and its Grassroots service currently serves some 2000 Manitoba farmers, who, with expensive crops at stake, can afford a terminal for worldwide weather news, commodity prices, spreadsheet-like pesticide and herbicide calculators (what will kill pests A, B and C without killing crops D and E, and what's its price and application procedure?) and home banking and entertainment options.

Both Infomart projects are expanding, in partnership with American firms—Teleguide kiosks will bring hotel, restaurant and sightseeing data to San Francisco, Sacramento, Phoenix and Honolulu (an Ottawa rival, the Genesys Group, is placing terminals in Oklahoma City and elsewhere), and Grassroots is heading for California and the Midwest.

### NAPLPS and Micros

Most of today's videotex still involves expensive terminals, then, though inexpensive terminals are coming fast—but those are for TV owners. NAPLPS thrives on RGB monitors as well, and most industry watchers agree with Carlisle: "The best [videotex] market is PC owners."

"Micros and NAPLPS are really converging," Chang says. "The micro can provide all the functions needed for NAPLPS service. It's something that's booming; people are trying to capitalize on the large installed base of micros."

Says Norton, "There are all these Apple and IBM and Tandy machines out there just crying for things they can do. Someone did a study of PC owners and non-owners; those who had machines wanted videotex, and those who didn't—what they described they thought a PC should do sounded like videotex."

The new Mindset, an MS DOS desktop from Mindset Corp. of Sunnyvale, CA, is the first micro that can support NAPLPS without extra equipment; other machines are getting both hardware and software NAPLPS transplants, with more products appearing almost daily. Some implementations are incomplete. Commodore 64 cartridges or Apple II decoder cards, for instance, can't bring those models up to the full SRM (Service Reference Model) standard, which among other things specifies a terminal with 256 by 200-pixel resolution and the ability to show 16 simultaneous colors from a palette of 512.

The IBM PC, though, can become a fair terminal with color graphics boards to improve the display and software decoders to present NAPLPS information. Several programs, such as Microstar's $240 (U.S.) decoder, work with graphics boards purchased separately. Willowdale, Ontario's Micropixel, offers an Electrohome terminal on a PC board,

which combines hardware and a ROM decoder to turn an IBM into a full SRM-spec machine without using the micro's main memory.

Unfortunately, American hackers who get NAPLPS capability still lack NAPLPS material to look at (unless they live near, or are willing to call a Telenet number to reach, Viewtron in Florida). In Ottawa, Microtaure's Fred Charpentier is willing to remedy that with an IBM decoder that's "so small you can put it on a disk with another program," or with 300 or 400 graphics pages. For example, the Microtaure decoder (about $200 with a program to organize pages into a slide show) might form the background to a graphic adventure game.

With a suitable micro, decoder, page creation program and a hard disk, today's bulletin board sysops could easily become NAPLPS information providers. In fact, until more IPs offer services, the dazzling technology is dead in the water.

For $400, Microtaure will sell not only the decoder and slide organizer but a NAPLPS graphics program, letting would-be IPs use a micro instead of today's dedicated terminals to create and store videotex pages. (You'll need 256KB of memory and two monitors, one color to see the page and one monochrome for the program menu; Charpentier is working on a version that toggles back and forth, but says, "If you want to go into page creation and you have only one screen, your eyes are going to pop out of your head.")

TVOntario has a more sophisticated PC page creation program: Createx-C will cost around $1450, but lets you control the hue, luminance and

## Behind Telidon or NAPLPS Unsealed



saturation values of your monitor's RGB gun, choose from 266,141 colors (such as "very dark very pastel turquoise"), and generally make MacPaint users die of envy.

**Waiting for Radio**

With a suitable micro, decoder, page creation program and a hard disk, today's bulletin board sysops could easily become NAPLPS information providers. In fact, until more IPs offer services, the dazzling technology is dead in the water.

Gil Dobbin, senior consultant at the Communications Research Center, confesses, "The big problem with any of this stuff is getting people to take it out and implement a product with it." The Department of Communications' Brian Casey is more candid: "I think the problem is still there's nothing I want to see on the damn screen unless I'm a farmer."

That should change, even before the IBM/CBS/Sears launch in 1986. Argues Carlisle, "In the last six months things have jelled. Everything necessary to get into videotex has come together.

"A year ago, there were fewer than ten companies in the United States planning to offer videotex. Now there are more than 50. More than 100 cities are going to have videotex services started in the next two years. There's one planned for every major city in the United States right now. There's been only one service that's ever been running in the United States—Viewtron—that's been running for four months. So the statements about the acceptance or rejection of videotex in the U.S. market are premature."

And videotex is coming, if not hurrying. Besides Viewtron and Grassroots, there's Chicago's Keyfax (ASCII this summer, NAPLPS by fall), Los Angeles' Gateway (sponsored by Times-Mirror) and April's entry of another NAPLPS software package for the PC, from Big Blue itself. By the late '80s, helped by digital switching equipment and fiber optic cables replacing today's phone lines, there may be a decoder in every TV

"What Herb Bown and his [Communications Research Centre] team invented," says David Carlisle, "was by the laws of physics the most efficient way to transmit graphics." That's high praise, but NAPLPS (nee Telidon) is high technology—and, at the same time, remarkably simple.

To oversimplify a bit, NAPLPS is a superset or expansion of ASCII; more specifically, it allows not one but several character sets, which can be turned on and off (or swapped back and forth into the active set) by opcodes.

Its primary character set contains the familiar ASCII symbols; a supplementary character set adds symbols, such as fractions and European accents. There's also a set of 65 rectangular mosaic codes, as seen in Prestel or TRS-80 graphics, and a dynamically redefinable character set (DRCS) made of blank rectangles that can be assigned user-created fonts or symbols.

The heart of the system, though, is a set of picture description instructions (PDIs), developed by Doug O'Brien (Bown's colleague at CRC in the '70s and in the videotex consulting firm of Idon Corp. today). These are ultra-terse descriptions of five geometric primitives—the point, line, arc, rectangle and polygon—plus the incremental point, line and polygon.

PDIs describe a figure in terms of its position on a square page, which has x and y coordinates ranging from (0,0) in the lower-left to (1,1) in the upper-right corner. Since it's up to the individual decoder or terminal to translate NAPLPS coordinates into pixel locations, the coding scheme is machine-independent—a signal to place a dot at (.5,.5) might yield a dot at (180,100) on one monitor and (200,128) on another. (y coordinates above .75 aren't used, as most computer and TV screens are rectangular instead of square.)

A NAPLPS line, for instance, is defined by two points, and an arc by three—its end points and midpoint. (A circle is an arc with identical end points; the line between them and the midpoint forms a diameter.) NAPLPS draws polygons by connecting the dots; shapes are defined by their vertices, up to a maximum of 256.

NAPLPS also includes choices for logical pel (the size of a point or width of the paintbrush), for line textures with four defined and four programmable masks and for three color modes, each supporting a minimum 16 simultaneous colors from a palette of 512. There are 16 processes for blinking or changing the color table, ranging from simple flashing to simulated animation.

Another way to perform simple animation, not even to mention

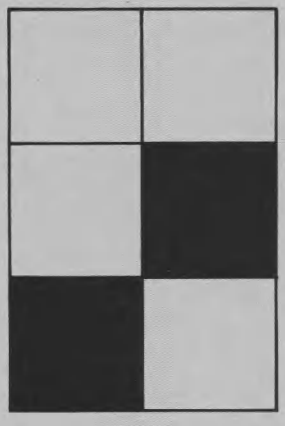


*Fig. 1. An alphamosaic character from NAPLPS's mosaic set. A British Prestel screen uses a 40×24 grid of these rectangles for a total resolution of 80×72.*

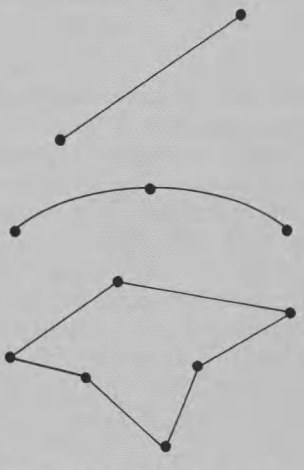


*Fig. 2. How NAPLPS uses points to define lines, arcs (with end points and a midpoint) and polygons.*

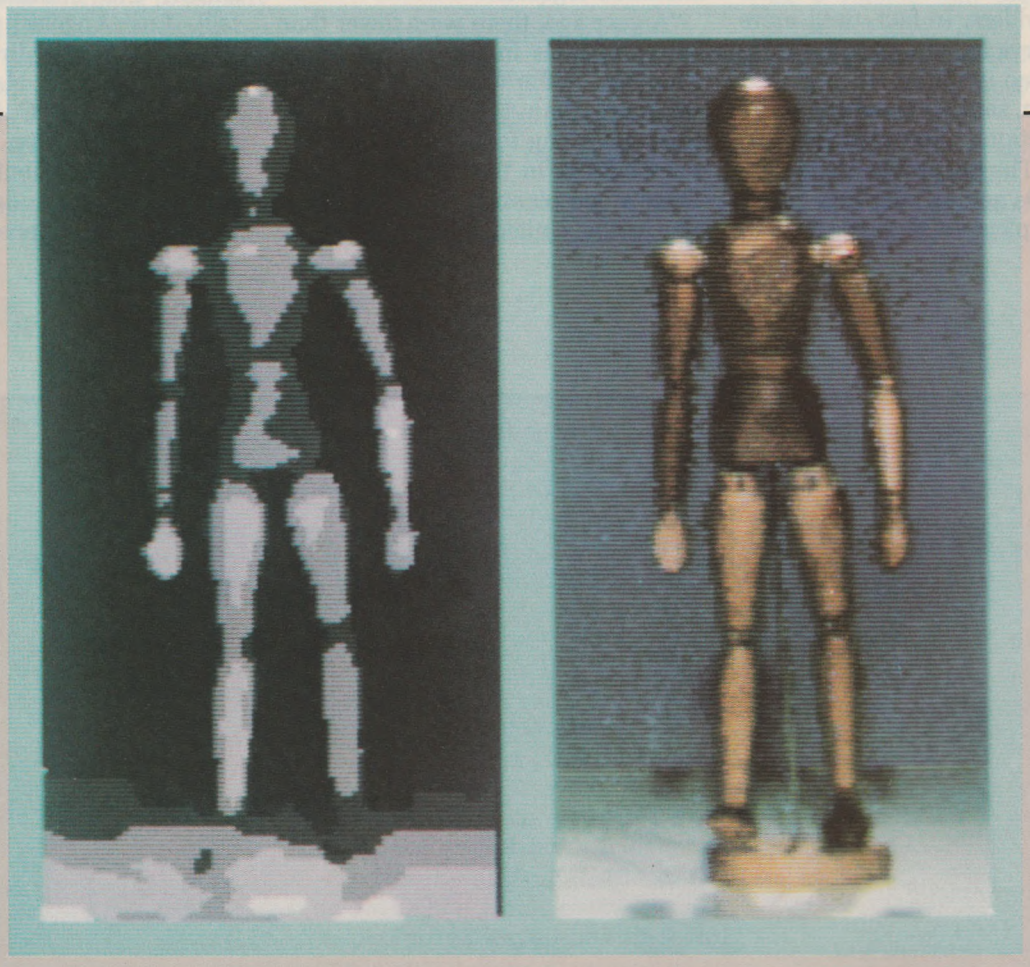
set and NAPLPS in every ROM chip after all.

"This whole videotex business has had some trouble evolving," Norton reflects. "All kinds of bold and hopped-up people made a lot of generalizations, [and people were disappointed]. We're not assuming, as we did for a few years, that we can go out and create a market. We're just looking to see what makes sense."

Adds Carlisle, "It's like radio in the '20s or television in the '40s. It's a medium, it's not a product. You don't go out and buy a videotex, any more than you buy a radio when there are no radio programs.

"We have an ability to transmit information ten times more efficiently than we had before, at ten times less cost than we had before. So what do we do with it?"■

*Telidon/NAPLPS screen photos from public-access and commercial videotex. (Courtesy of Canadian Department of Communications and The Genesys Group.)*



*Next-generation (higher-resolution) Telidon screens. (Courtesy of Canadian Communications Research Centre.)*

conserving transmission time, is with macros, instructions that call themselves or other instructions. Parts of a scene can be defined as macros, transmitted at once and called from RAM, rather then spending additional time on line with the information provider or database, or parts of a page—a sponsor's logo at the top, for example—can, having been drawn once, remain constant through multiple pages of information.

Of course, even NAPLPS pages contain words as well as pictures; the scheme supports six sizes of 20-, 32-, 40- and 42-column text with four intercharacter and four interrow space settings. Authors can move and rotate text in four directions.

Beyond that, the CRC lab is working on even better graphics, digitization of photographs (so far, Carlisle claims, down to around 10,000 instead of the usual 300,000 bytes) and sound. A "talking Telidon" drew crowds at the Videotex '82 trade show but still takes too much memory for practical use, besides violating NAPLPS' hardware independence by requiring specific speech synthesizers. The average NAPLPS page, such as the ones that illustrate this article, takes between 300 and 400 bytes.

The official November 1983 NAPLPS standard is available as a 156-page, $20 book, *American National Standard for Videotex/Teletext Presentation Level Protocol Syntax*, from the American National Standards Institute (1430 Broadway, New York, NY 10018) or the Canadian Standards Association (178 Rexdale Blvd., Rexdale, Toronto, Ontario, Canada M9W 1R3).

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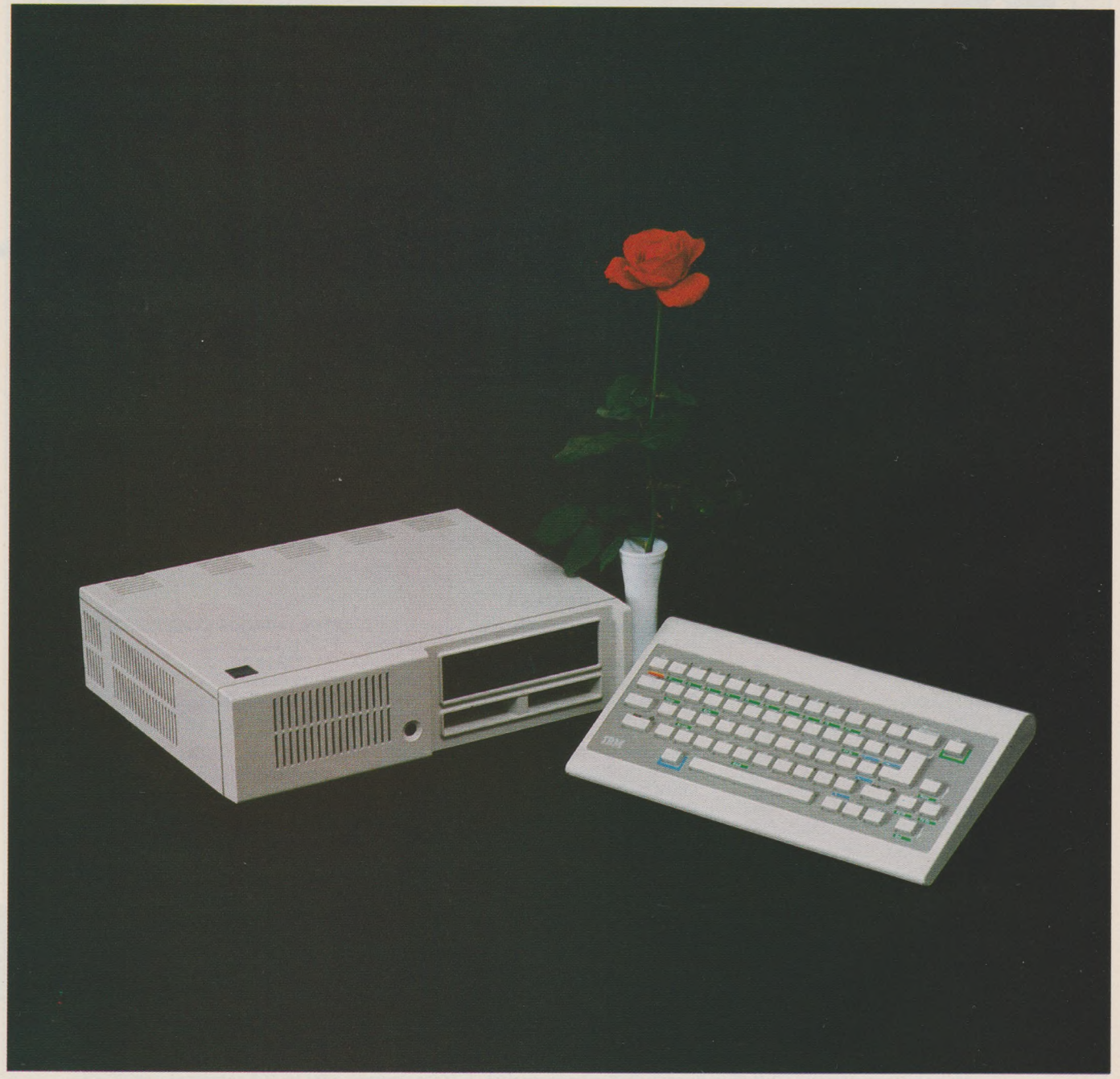
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# Will Junior Make the Grade?



*Since the debut of the IBM PCjr last November, the public's response has been less than overwhelming. And the question "Will Junior succeed?" has been a frequent one. Ken Sheldon takes a hard look at Junior and reports on whether PC's little brother is destined for greatness or mediocrity.*

By Ken Sheldon

The IBM PCjr—is it an innovative useful computer or just a repackaging of old technology? Having already covered the basic ground on Junior (*Microcomputing*, December 1983 and January 1984)—let's take a closer look at what makes up the machine, what may or may not make it a success and how it compares with its big brother, the PC.

**Heart of the Matter**

Let's start with the CPU. The IBM PCjr is built around the Intel 8088, the same hybrid microprocessor used in the PC and XT. I say "hybrid" because it is neither an eight-bit nor a true 16-bit computer chip. While eight-bit processors have eight-bit data paths and 16-bit address paths, the 8088 has an eight-bit data path and a 20-bit address path, which allows it to address just over a megabyte of memory (two to the 20th power).

If that doesn't impress you, remember that until Junior was released, most home computers were based on eight-bit chips that could address only up to 64KB of memory. Oddly enough, a year ago that seemed like quite a lot. Today, it seems barely adequate—like a monaural recording instead of stereo.

The clock speed of the 8088 is 4.77 MHz, which makes it slightly faster than the Z80 and much faster than the 6502. However, for a variety of reasons, the IBM PCjr is a little slower than the PC. For example, the display and processor use the same circuits when accessing memory, which slows things down.

Generally, PC programs running in RAM (the majority of them, at this point) run more slowly on Junior, while those running in ROM (cartridge programs) run faster than their disk-version cousins on the PC. These timing differences won't affect much, however, unless it's to slow down your favorite video game just a hair so that you can actually score for a change.

The entry model IBM PCjr comes with 64KB of random access memory (RAM), though not all of this is available for the user. In the graphics mode, the display takes up 16KB, leaving you with 48KB, and in the alphanumeric mode, the display takes 2KB, leaving you with 62KB. Similarly, the enhanced (128KB) Junior actually provides you with 112KB or 126KB, depending on what mode you're in. The same isn't true for the IBM PC, since the color graphics board comes with its own 16KB screen buffer. The point is, if you're trying to run IBM PC software that takes up most of the 64- or 128KB of RAM, it may not run on Junior.

Speaking of those graphics, they're quite a bit more versatile than the PC's, primarily because changes were made to allow the use of a color television as a monitor. Three resolution modes are now available, as shown in Table 1, a chart from Junior's *Technical Reference Manual* (pp. 2–56).

Note that the greater number of colors are available only in medium- and high-resolution when the full 128KB of RAM is on board. Also note that high-resolution graphics are only available on high-resolution monitors, not televisions or low-resolution monitors.

Junior's 8088 chip can technically address up to a megabyte (1024KB) of memory, so there's no reason why the RAM couldn't be expanded beyond 128KB, up to the 640KB set aside on the 8088 chip by IBM for the PC.

However, Junior doesn't have any extra room or sufficient power to handle such an addition internally. Any memory add-on has to be accomplished externally, through the 60-pin I/O bus on Junior's right side (intended for the parallel printer port attachment). It has to have its own power supply. At least one company, Legacy Technologies, Ltd. of Lincoln, NE, has announced such an add-on, with an open architecture to allow the insertion of cards designed by other manufacturers.

**Unordinary Routines**

Junior comes with 64KB of ROM. When a computer comes with that much ROM, it often means the manufacturer has built things in to make the computer easier to use—Junior is no exception. Junior's ROM includes a self-test that runs each time you boot up, the cassette operating system, cassette Basic, the Basic input output system, diagnostic routines for the various peripherals and a tutorial for absolute beginners entitled Keyboard Adventure. Most of these are self-explanatory, but at least one of the diagnostic routines reveals an interesting facet about Junior's future.

The diagnostic routines (initiated by hitting control, alternate and

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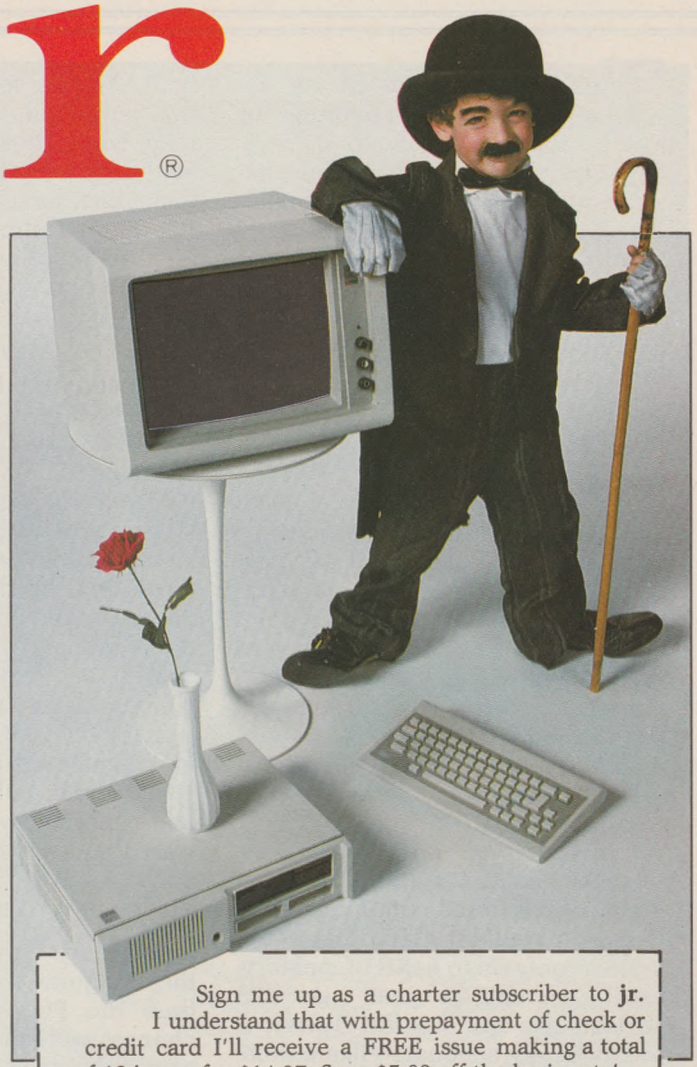
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insert all at once) begin by presenting icons of Junior's disk drive, display, joystick, sound function, keyboard and modem. Under the keyboard icon are two letters. Selecting the first letter begins a test in which a little man builds an image of the keyboard on the screen, depositing a square for each key as it's tested. Eventually, you have a replica of Junior's keyboard on the screen—nothing unusual about that.

Choose the second test (listed as "reserved for future use" in Junior's *Guide to Operations*) and an interesting thing happens. At first, the test looks just like the first one—until you start pressing Junior's function keys. Then, instead of picturing them along the top of the keyboard where they actually are, the little man places them in a two by five block of keys at the left-hand side of the screen image—exactly where the IBM PC's function keys are. Try this out at your friendly neighborhood computer store and ask them what it means.

| Graphics Mode | Horiz. (PELs) | Vert. (Rows) | Number of Colors Available (Includes Background Color) |
|---|---|---|---|
| Low-resolution 16-color | 160 | 200 | 16 (includes b&w) |
| Medium-resolution 4-color | 320 | 200 | 4 colors of 16 available |
| Medium-resolution 16-color | 320 | 200 | 16 (includes b&w) |
| High-resolution 2-color | 640 | 200 | 2 colors of 16 available |
| High-resolution 4-color | 640 | 200 | 4 colors of 16 available |

*Table 1. Graphics modes. The screen's border color in all modes can be set to any one of the 16 possible colors. This border color is independent of the screen's work area colors. In black and white, each color maps to a distinct gray shade.*

### Keys and Links

While I'm on the subject, Junior's keyboard is a problem for those used to a regular typewriter-style keyboard. It just doesn't feel or sound like a keyboard should (even if you turn on the function built into ROM that generates a click each time you press a key).

Also, the numbers and letters are printed above the keys rather than directly on them. This is to allow you to redefine the keyboard and place a cardboard template over the keys to rename them. If you want to set up the keyboard on the Dvorak system, you can. But for traditional typists, not having the keys marked can be confusing.

Although Junior has fewer keys (62) than the PC (83), each of the PC's keys is mimicked by some combination of Junior's keys. This is fine in most cases, except when it involves, for example, shifted function keys. In Junior's case, this can involve digital gymnastics that give new meaning to the phrase "writer's cramp." Until software developers change their programs to better utilize Junior's keyboard, some of these programs will be difficult to use.

As for Junior's infrared link—which generated much of the interest in the keyboard—it works just fine. Personally, I prefer using the keyboard with the cord, a skinny little thing when compared to the PC's heavy coiled connector. Maybe I need the security of a direct connection to my computer. Besides, what good does it do to sit 20 feet away from your computer unless you're farsighted? Still, some people may appreciate the freedom of movement afforded by the infrared link and, for them, it's great.

In spite of the reservations noted above, newcomers to typing and computing will find Junior's keyboard perfectly adequate, and it fulfills IBM's requirements—it's tough and inexpensive. If you're not using programs that are keyboard intensive, it won't bother you. If it does, you can always buy a replacement keyboard from one of several manufacturers who have promised them or perhaps even from IBM itself.

### Lone Drive

On to the disk drive: at present, the IBM PCjr supports only one disk drive. This means that installing DOS onto programs, backing up programs and using programs with separate data disks is a terrific pain in the wrist. Fortunately, companies such as Legacy are figuring out ways to add another drive.

Perhaps one of the nicest things about Junior, oddly enough, is its ROM cartridges. To begin with, ROM cartridges allow you to increase your computer's ROM in about two seconds and to change that ROM just as quickly. When you plug a cartridge into Junior, you add 32KB of ROM to it; both cartridges together add 64KB of ROM. You can run programs in ROM without using up valuable RAM space—and it may solve the problem of disk swapping. When software publishers put "serious" software on cartridges, the disk drive can be used for data storage.

Unfortunately, ROM cartridges are expensive to make. Putting a program on a cartridge requires the publisher to get it right the first time—he can't just issue a new version every time someone discovers a bug in the program. Still, some companies are committing themselves, like Lifetree Software, who is releasing a cartridge version of its popular Volkswriter word processor.

Before I leave the subject of cartridges, it's interesting to note that Basic takes up 10KB of RAM when loaded into the IBM PC; Advanced Basic takes up 14KB—memory that is still available to Junior users, since their Basic is residing on a ROM cartridge.

### Will Junior Run?

Perhaps the biggest selling point

of the IBM PCjr is its compatibility with the IBM PC. After all, who wouldn't like to have a PC for $1269, not to mention access to all that software? And although this is a little unrealistic (the price climbs when you add the cost of a monitor, printer, cables and so on), it's still a good enough reason to consider buying a Junior. The question is, how much of the PC's software actually runs on Junior?

Well, as the man said, that depends. When the IBM PCjr was first announced, a number of software companies stated that, since their IBM PC software took less than 128KB and ran on one disk drive under DOS 2.1, it would work on Junior. Some faces were mighty red when Junior became available and it wasn't all that easy.

To begin with, there's the problem of the display memory mentioned earlier. Anything that takes up the full 128KB simply doesn't fit on Junior.

Other software publishers assumed that, because their software was written in assembler language for the 8088 chip, it would automatically work on Junior. And, in fact, those who had used the PC's BIOS and DOS interrupt interfaces (which are maintained in Junior) found that their programs ran fine. (Note that, according to the PCjr's reference manual, the code of Junior's BIOS is not identical to that of the PC—just the interrupts. What this means is that Junior's BIOS presents the same face even though the inner workings may be somewhat different.) Programs that violate the BIOS and DOS interrupts—often for reasons of expediency or to make the program run faster by directly addressing routines or storage locations—may not work on Junior.

Another chink in the PC compatibility chain is Junior's disk drive. Although it has the same capacity as the PC's disk drive (360KB), it has a different hardware address and doesn't operate through direct memory access (DMA). What this boils down to is that neither keystrokes nor asynchronous communications may take place at the same time as disk I/O—and any program that allows that to happen may not run.

Some of Junior's other hardware features may give programs trouble, such as the fact that when the optional internal modem is installed, it's automatically designated as "COM1". Communications, speech synthesizer and other types of software that violate that protocol may not work correctly.

**They Work!**

You may think that few programs would ever make it through this gauntlet of compatibility criteria, but the fact is that quite a few do. To begin with, most programs written in Basic or BasicA run just fine on Junior—and this includes a large amount of home-brew public domain software that's available for the PC.

---

If I were a teacher,
I'd give Junior
a good, solid B+,
with the admonition,
"I know you can
do better."

---

Some 8088 assembled programs, through a mixture of luck and foresight, obey all of the right rules. Such is the case with Infocom's interactive games, such as Zork, Deadline and Planetfall—none of which, by the way, have graphics that might mess up the works.

A good number of programs will run on Junior as long as you're not afraid to do a little fiddling with them. Typically, for example, some programs designed to fit into 80 columns come up on Junior in a scrambled 40-column mode. To correct this, invoke the "Mode 80" command from DOS 2.1 before you begin the program. Eventually, publishers will make these changes to Junior-version packages themselves, but the point is that there's software you can use right now, with a few adjustments.

Junior has a few other pluses and minuses. On the plus side (for PC compatibility) is the fact that IBM has tried to make Junior's ports as similar to the PC's as possible, while still making them easy to understand and connect. Without even looking at the documentation (something most of us seem loathe to do), you can easily figure out that the K on the back of Junior is where the keyboard cord (also marked K) is connected. Similarly, the joysticks and joystick interfaces are marked J, the display is D and so on.

In some instances, adding an optional cable to a port makes it exactly the same as the PC's port. For example, the serial (S) port plus adapter cable gives you the same connector as the serial communications card for the IBM PC and, therefore, access to the same serial devices as the PC (with the caveat about the internal modem being "COM1" as noted above). Why didn't IBM just make the ports the same as the PC's? That's a good question. Perhaps it was for reasons of space or to facilitate future enhancements.

One minus for Junior is its overlarge footprint, mostly due to the fact that the monitor can't sit on top of the main system unit. Aside from heat and interference problems, the system unit simply wasn't built to support a monitor. It's made of plastic, not metal, as the PC is.

Overall, Junior seems to be a solid, dependable machine with a bright future in terms of expansion. At the heart of this expansion lies the 8088 chip, whose power Junior has not yet begun to use.

**Report Card**

If I were a teacher, I would give Junior a grade of 85 percent—not a spectacular grade, just a good, solid B+—and the admonition, "I know you can do better." (My teachers were always fond of saying that.) The point is that Junior can, and probably will, do better as hardware and software become available to expand its latent capabilities.

In the meantime, a B+ is nothing to sneeze at. "Slow and steady wins the race," as the tortoise said to the hare, and the solid, dependable student with an excellent attendance record often turns out to do better in the long run than the smart new kid on the block—who turns out in the end to be nothing more than an Apple polisher.■

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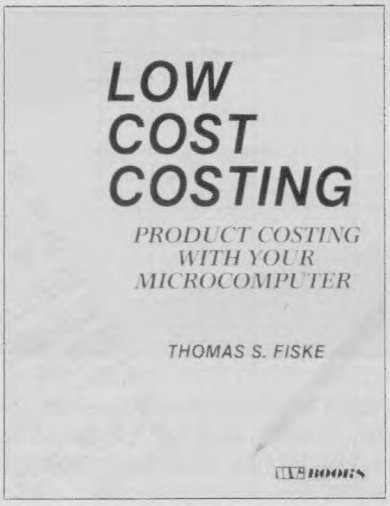
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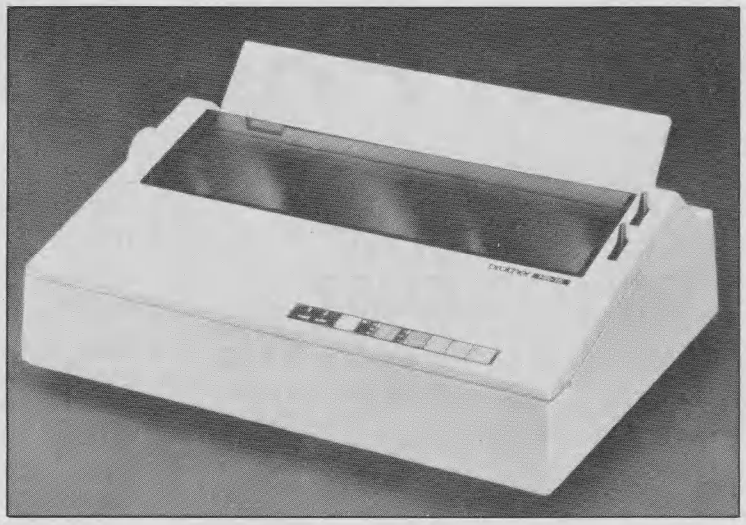
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# Oh, Brother!

*The Brother HR-15 Daisy Wheel Printer may not be as fast as those hot-shot dot-matrix printers, but it is inexpensive, prints fully formed letters and will satisfy your word processing needs.*

By Lewis M. Phelps



When I bought and built my Heathkit H89 computer, I planned to use it extensively for word processing, as many people do. Its keyboard and screen are well-suited to the job, and the numeric keypad is a convenience that many other popular computers lack. Coupled with one of the word processing programs that uses the Heath/Zenith special function keys, the H89 is almost as flexible and easy to use as a dedicated word processor.

For some months, due to a lack of available funds, I put off purchasing a printer. I'm glad I did, because when I was finally ready to buy, I discovered a new product on the market that I think is a real winner—the Brother HR-15 Daisy Wheel Printer. While it's not nearly as fast as the hot-shot dot-matrix printers, and it can't print graphics, it has one overwhelming advantage. It prints real, fully-formed letters, just like any full-fledged word processing system.

It's also incredibly inexpensive, particularly when you consider the quality of the machine and its many features. I bought my Brother HR-15 at a computer printer retail store in San Francisco for $540 in its RS-232C serial version. The Centronics parallel version sells for $515. Some mail order houses are advertising the unit for even lower prices, although I prefer to do business with local dealers when prices are close. The HR-15 sells for less than several of the competitive low-cost daisy-wheel printers on the market, and I'm convinced that the HR-15 has broader capabilities than its direct competitors.

### The Basics

The basic specifications of this nifty little machine tell a lot about it. It prints at 13 characters per second (cps) maximum speed and at 11 cps Shannon text, pica pitch. Character pitch is variable, with ten, 12 and 15 characters per inch (cpi) plus a proportional spacing mode available through panel controls and other pitches accessible through software controls.

Print outputs available include automatic underlining, automatic strikeout (useful to lawyer types), double print (each character struck twice for emphasis) and shadow print (each character struck twice with a $\frac{1}{120}$-inch shift to the right by the printhead for even greater emphasis). You can also produce underlined shadow and double print.

The platen is 13½ inches wide, though copy is produced on only 11 inches of that total, giving a maximum of 110 characters at ten cpi, 132 at 12 cpi and 165 at 15 cpi. Single, one-and a-half and double line spacing are available through panel switch control. As with character pitch, line spacings can be software set. There is a 3KB (5KB optional) copy buffer, and a copy button to make multiple copies of whatever is stored in the buffer just by pressing the button.

The 96-character daisy wheel is enclosed in a cassette for quick and easy changing. Brother produces daisy wheels for a dozen different typefaces, most of which are available in a number of foreign languages as well as in English. These include type styles optimized for ten, 12 or 15 cpi as well as specialized faces.

The ribbon is an easily changed cassette type. Brother makes four different ribbons for the HR-15. They are multistrike nylon, multistrike carbon, single-strike carbon and correctable carbon. These same ribbons are used in the widely sold Brother electronic typewriters so they're available from many typewriter dealers as well as from your friendly local computer store. A second ribbon on a small open spool allows use of red letters, for highlighting, or of correction tape, if the unit is used directly as a typewriter.

Brother makes three optional at-

tachments for this printer. One is a keyboard that plugs into the HR-15, but with a computer, I have no need for that. It sells for $175 at the store where I bought the printer. A tractor unit (priced at $140) and a cut sheet feeder unit ($260) are also available. Both accept paper to a maximum of 11 inches rather than the full 13½ inches of the platen width. I haven't used any of these options, but the printer is designed to make their installation quick and easy.

Brother also makes a larger and faster version of this printer, called the HR-25. It has a wider carriage (15 inches) and prints at 20 cps but otherwise has specifications identical to the HR-15. It retails for about $800.

The manufacturer seems to have taken an interesting marketing direction with this printer. It's advertised and sold in the U.S. market under at least four different names, including the Brother label itself. Identical or very similar products are sold by Dynax Inc. as the Dynax DX-15 and by Comrex, a part of the Epson family, as the CR-II Comriter. A version with a greatly expanded print buffer (35KB expandable to 67KB) is sold under the DTC Style Writer label by Data Terminals & Communications. The Dynax and Comrex units seem to be priced similarly to the HR-15, while the DTC unit is naturally more expensive. The cost of the DTC Style Writer seems competitive with the cost of the HR-15 plus a separate print buffer and, of course, it would be one less box on your desk.

### Unpacking the Goods

When I unpacked my HR-15, the care the Japanese manufacturer had taken to prevent damage immediately impressed me. The printer was suspended well away from the sides of its rugged box by two large plastic foam blocks, molded to fit around each end of the printer. The carriage and interior of the printer were further protected by a number of small foam blocks wedged next to key points, as well as two red plastic tubes that had been slit and placed over the main printhead carriage bar. A packing sheet illustrated removal of all packing materials. It's worth paying attention to this sheet; my dealer said about half the people to whom he sells an HR-15 call to complain that it doesn't work, when in fact the only problem is that they haven't removed all the packing protection.

This is a handsome piece of machinery. The case is beige plastic and cleanly designed. The panel controls are color-keyed touch switches. LED lights indicate the status of functions set by the panel switches. These switches control whether the unit is on- or off-line (select), the line spacing, pitch (characters per inch), whether the copy function is engaged and top-of-form and line feed. Additional LEDs provide power-on and alarm indications. If there's trouble, such as the ribbon running out or paper jam, the HR-15 emits a loud and piercing beep as well as turning on the red alarm LED.

This is a handsome piece of machinery. The case is cleanly designed; panel controls are color-keyed touch switches.

The printhead and platen are covered by a piece of lightly smoked clear plastic for sound control, helping to make this a relatively quiet printer. (The spec sheet indicates a noise level of 65 db or less at one meter.) The power switch is easily accessible on the left side toward the rear. The other controls are manual levers for lifting the paper bail and roller pressure, and a knob for manually rotating the platen. Dip switches on the back set the language in use, default page length, automatic line feed on/off, automatic skip perforation on/off, and for serial units, parity and bit rate information. Bit rate settings from 110 to 9600 bits per second (bps) are available.

### No Trouble

Under the hood, the HR-15 appears relatively uncomplicated, which leads me to believe it won't cause much trouble over the years. It's also substantially engineered. Key parts are metal, not plastic, and the printhead is driven by a braided steel cable. Brother keeps its reputation for reliability intact with this machine.

Hooking the unit to your computer requires an appropriate cable, which your dealer can supply. With my H89, the RS-232C serial cable required modification at the printer end to tie pins 4, 5, 6 and 8 together. You'll also have to modify your operating system settings to accommodate the printer. With my CP/M 2.2.02, I ran CONFIGUR to set the LST: logical device as LPT:, printer ready signal at DTR (pin 20) and printer ready polarity HIGH. Bit rate settings on the dip switches and the operating system configuration should, of course, be the same. I have mine set to 9600 bps to provide maximum speed of data transfer.

One word of caution: the Brother product literature specifies that the HR-15 emulates the Diablo 1610 printer, and the Heath CP/M literature says that for a Diablo the LST: logical device should be set as the UL1: physical device, but this doesn't work for the HR-15. The UL1: device is defined as one with ETX/ACK protocol, which the Diablo printers have. LPT: devices are defined as serial printers with hardware handshaking, which the HR-15 has. Therefore, use the LPT: physical device as the LST: logical device.

The printer also requires setting the two separate dip switches on the back. The left-hand one (as you face the back of the printer) sets the printer for the language being used with the daisy wheel chosen. For an ASCII print wheel, all eight switches are in the closed (down) position. The instruction manual details other language settings as needed. The right-hand switches control several things.

Of importance to any Heath/Zenith user are the settings for switches 3 (length of data), 4 (selection of parity) and 5–7 (baud rate). Switch 3 should be set to open (up) to reflect the H/Z89 output of eight bits (no parity). I have switch 4 closed (down), although with switch 3 open the position of switch 4 doesn't matter. (These settings [switches 3 and 4] conform with the normal setting of an H89. The H89 settings can be changed with switch S401 on the terminal logic circuit board; switch section 3 controls parity/no parity and section 4 selects

odd/even parity if parity is selected on section 3.) Switches 5 through 7 of the HR-15 are set depending on bit rate, as specified in the printer manual. At 9600 bps, all three are closed (down). Switch 8 isn't used.

It's important to note that the instruction manual errs in describing the method of setting these switches. It says they must be set with the power switch on. Actually, you must set the switches with power on, then turn the power off and back on again to reboot the printer's microprocessor to any new dip switch setting. This is but one example of the poor documentation for this printer, which I'll discuss in more detail later.

With these matters taken care of, you can begin printing with your HR-15. The output is very nice. With the fabric multistrike ribbon, it's clean and sharp, just like word processor output should be. For extra special documents (a resume, for instance), you can switch to the single-strike carbon ribbon, which gives an even cleaner and sharper impression. You wouldn't want to use the single-strike ribbons regularly, though, unless you're so wealthy that you can buy a full-fledged Diablo in the first place. You can run through a single-strike ribbon in a big hurry, and it costs about $8 to replace.

In short, this is a highly flexible and capable printer. Aside from the lack of speed compared with its $2000–$3000 counterparts, it does just about everything you need from a letter-quality printer either for the home or the small-business environment. If you're in the marketplace for such a printer, you have to evaluate for yourself just how important speed is. If you can stand 13 cps, this is a unit well-worth looking at. And if you need 50 percent greater speed, the HR-25 makes sense.

Does the HR-15 have any flaws? Yes, a few. The paper guide can be moved back and forth in a slit in the paper support, but there's nothing to keep it in place once it's moved, not even significant friction. If you want to set it anywhere except in the left-most position, you'll have to hold it there with a piece of tape.

Also, the printer logic circuits assume that unless you buy and install the optional tractor feed unit, you're running single sheets of paper. As a consequence, after the last page of a printing job, it goes through an elaborate three-step form feed designed to eject a single sheet. This wastes a sheet of paper if you're using continuous paper without the tractor (as I often do).

### A Problem

My only major complaint about this product is the miserable documentation provided. It's printed in Japan and obviously written by someone for whom English is a second language. With all their marketing savvy, you'd think the Japanese would hire an American technical writer to produce documentation for printers they sell in the American market. Brother didn't and it shows.

First of all, the 48-page instruction manual comes with four pages of corrections that must be entered by cutting out sections of paper and taping them into the manual or by writing in the smaller changes. This results in a messy reference book. At that, not all the typographical errors and redundancies were caught. With a $600 machine, an extra $1 per unit would have paid to reprint the whole instruction manual instead of a four-page correction sheet.

The operating instructions are, to put it charitably, vague when they discuss use of escape and control codes to control printer functions. The following, for example, are Brother's verbatim instructions for controlling character pitch:

"(1) Setting Character Pitch (HMI)

ESC + US + n sets character pitch.

ESC + S causes HMI to return to Panel SW.

$HMI = (n - 1) \times 1/120$

The n specifies 1–126 excepting NUL and DEL codes and HMI can be set in 1/120-inch increments.

After HMI is set, carrier moves in the amount of HMI in each print or space.

Under PS mode, the setting cannot be made.

ESC + S causes HMI to return to Panel SW." (Note redundant line.)

Now for the translation: US stands for the ASCII nonprintable character US (decimal 31). This is output from the keyboard of my H89 with CTRL_ (underscore). The n turns out to be a decimal ASCII value, not a numeral. Running through the formula shows that for a pitch of 1/10 (that is, 10 cpi), n = 13, which is equal to CTRL-M, which is also CR (carriage return) under the ASCII code scheme. Thus, to set cpi on the printer to ten, you must transmit ASCII values of 27, 31 and 13. The keyboard equivalents are ESC, CTRL_ (underscore) and CTRL-M.

It's between you and your word processing program to figure out how to transmit that to the printer. (In Basic the whole sequence would be LPRINT CHR$(27); CHR$(31); CHR$(13).) To save you the computation, for 12 cpi n = 11, and for 15 cpi n = 9. These are equivalent to CTRL-K and CTRL-I, respectively, which in turn are the ASCII control codes for VT (vertical tab) and HT (horizontal tab).

You can set for any other character pitch you want, from an illegible 120 cpi to a very stretched-out one cpi. Software controls can be used to set line spacing, page length, left and right margins, horizontal and vertical tabs, top and bottom margins, reverse line feeds, half line feeds for printing superscripts and subscripts and 1/120-inch backspace.

Most of these require relatively simple escape sequences (for example ESC-E sets automatic underlining and ESC-R turns it off), but it takes gymnastics tricks similar to the character pitch setting to control the line spacing, absolute horizontal tab movement, absolute vertical tab movement and page length. All require computation of a value of n and then reference to an ASCII chart for the character equivalent if your word processing software can't directly output an ASCII value. The manual has all the information you need to do this, but you have to dig to get it.

I don't mean by any of this to demean the printer itself; I think it's a first-rate product. But I simply don't understand why a company with enough collective brains to engineer a product of this quality can't also figure out a way to hire a writer who can produce a comprehensive and comprehensible product manual.■

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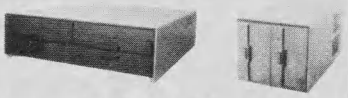
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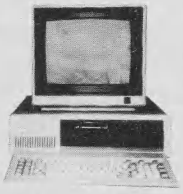
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# Looking into WindowMaster

*If you've decided you want to do windows, WindowMaster may be worth a peek. It's reasonably priced and does an adequate job of tying applications programs together.*

By Eric Grevstad, Senior Writer

It's nice to see small companies compete with big ones, but it's hard to embrace Structured Systems Group while ignoring Digital Research and Microsoft. SSG's WindowMaster is a reasonably effective, reasonably economical ($295) way to tie applications programs together.

I enjoyed playing with it, but there are three reasons why I'm not enthusiastic: I'm not convinced of the value of patched-together rather than truly integrated systems; WindowMaster has some quirks and flaws; and—in words SSG has doubtless heard from customers—I haven't seen DRI's Concurrent DOS, Microsoft's MS Windows or Quarterdeck Office Systems' DesQ.

Like those products, WindowMaster is an operating environment that lets an MS DOS micro run several programs at once, or at least lets you move between programs without ending the first, going to DOS and starting the second. For esthetic, if not always practical, reasons, different programs can share screen space by appearing in windows, which you can shrink, expand or overlap as you desire.

WindowMaster doesn't attempt to give a common command structure; each program remains independent, unlike parts of more sophisticated unified packages like Symphony or Ovation. However, you can transfer material from one program to another (in a raw data or ASCII sort of way), and WindowMaster bends over backwards to accommodate any software in your library. There are provisions for plain MS DOS programs, direct memory address (DMA) programs that bypass MS DOS and speak directly to PC video, and a utility that copies CP/M-86 files onto an MS DOS hard disk.

The hard disk is mandatory. SSG's manual claims WindowMaster will work on floppy-based systems but admits that the program fills 256KB of the disk's 320KB space. Since applications must be on the same disk as WindowMaster, that would limit you to one or two tiny programs.

Even with lots of mass storage, 256KB RAM will only support WindowMaster and about one program; your best bet is a hard disk, 512KB and a color graphics board and monitor. (I used a Compaq Plus, upgraded to 512KB with a Quadram Corp. Quadboard, and things looked fine in monochrome.)

### A Program That Runs Programs

Besides being in the same MS DOS directory, each application to be used under WindowMaster must be installed, with a file for its minimum and maximum memory requirements, whether or not it uses video or graphics RAM and so on. WindowMaster already knows specs for several popular programs (WordStar, Lotus 1-2-3, dBase II); you install others through the program set-up choice of the program management menu.

The set-up process, guided by ample prompts and menus, is easy enough, but there was a bug in my version (1.0). The program refused to accept memory allocations greater than 64KB for .COM programs, even though WindowMaster's own file for 1-2-3 specifies 128KB minimum and 256KB maximum workspace. A call to SSG's technical support line brought a fix—to install Basic, for instance, I had to rename (from DOS) BASIC.COM to BASIC.EXE, go into WindowMaster and the set-up procedure, return to DOS and re-rename BASIC.COM and then start WindowMaster again.

Once you've installed your programs and booted your machine on drive C:, typing WM and pressing the return key starts WindowMaster. (SSG has a fetish for two-letter filenames; its Word Right word processor, Magic Worksheet spreadsheet, and name and address programs are WR, MW and ND, respectively.)

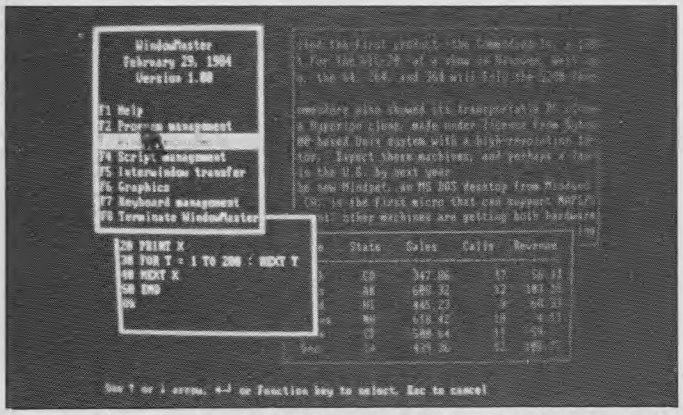
Even though you've transferred WindowMaster to the hard disk, the SSG disk must be in drive A: at start-up. You can remove it after the program reads your serial number and displays the main menu.

The main menu, like the various submenus, offers a list of functions selected by pressing the PC function keys or by moving the cursor to a selection with the arrow keys and pressing return. During a work session, you can always reach the main menu by pressing the Alt and F1 keys; from submenus, you can back into it via the escape key.

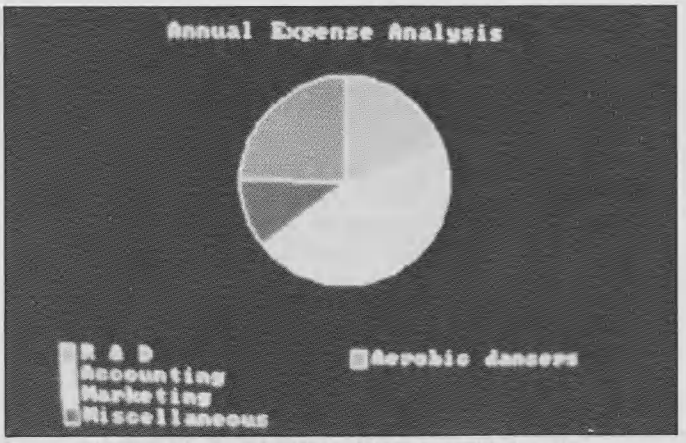
Whichever menu you're in, F1 calls a help screen or screens for the function selected or highlighted. I occasionally blundered into different help screens or the main menu when I wanted to get back to an application, but the help features are a good addition to the manual—which is nicely organized but skimpy on examples or instructions.

### Window Architecture

The functions you'll use the most fit under F2 and F3, the program management and window management submenus. The former contains




*Basic word processing and spreadsheet applications running under WindowMaster. The main menu is in the upper left.*




*Pie chart drawn with WindowMaster's graphics function.*

options that let you run a program (prompting you for its name), list the installed applications, install a new one, change an application's specs, put CP/M-86 programs on your hard disk and monitor WindowMaster's status—what programs you're running and how much memory is left.

A sub-submenu, Advanced Functions, lets you redirect a program, sending screen or printer output to a disk file or using a disk file as keyboard input, or run a DMA video program that would otherwise collide with WindowMaster's displays.

There's also a way to kill a program, if for some reason you can't exit from it normally. (Under WindowMaster, ending an application doesn't bring a return to DOS but the words "Successful program termination;" you can't exit WindowMaster until you've shut everything down.)

The most fun to be had from the main menu comes under F3, the window management option. Select it, and the active window (the screen showing the program in use) is yours to shrink, expand or move with the numeric keypad; once you learn that F2, F3 and F4 control shrinking, growing and moving, respectively, you'll spend hours whittling your word processing or spreadsheet displays into cute little squares or rectangles and sending them roaming all over the screen.

As a window controller, the keypad works nicely—not only do the up and left arrows (eight and four) cut or inflate a window's top and left side, for instance, but the home key (seven) works on both the top and left sides at once, stretching or shrinking a window Macintosh-fashion. The repeat or key bounce is a little tricky—impatient at a margin's moving one character at a time, you'll suddenly find it taking great leaps—but, with some flipping between the shrink and expand modes, you'll carve windows as precisely as a surgeon.

You can also press F5, which lets you use the keypad to scroll data within the active window, or F6, which scrolls for you until the cursor appears.

If you've more than one application running, the window management menu's F7 choice changes the active window (which is indicated by a double border on screen). Pressing the space bar cycles through your applications; you're still in window mode, with the function keys ready to shrink or scroll the different boxes, until you press the return key, selecting a window and putting you into that application.

To go from one program into another, then, involves pressing Alt-F1 (main menu), F3 (window management), F7 (change windows), the space bar (to get the new application in the active window) and the return key. That's assuming you're using full-sized windows, which I recommend; the fun of cute peepholes stops when you enter an application, realize you have no idea where the cursor is or what your last paragraph said, and must jump back into WindowMaster to enlarge your horizons.

### Data Swapping and Picture Drawing

The real reason for small windows appears when you transfer data from one application to another, using the main menu's F5 (interwindow transfer) submenu. The simplest method is unfiltered transfer, in which you shrink the sending window down to exactly the material you want to move, select the sending and receiving windows by cycling through them with the space bar, and press the return key to choose a destination. It works like a charm, and since a window can be any size from one character up, it's easy to frame a column of numbers or a paragraph of text.

It's more trouble than it's worth to use WindowMaster's filtered transfer options, in which you work from larger windows but have to play a keyboard sonata to tell the program which characters or lines to skip and which to send.

To its credit, SSG lets you trim keystrokes with two labor-saving features, a "script" or macro option and the ability to establish programmable function keys. Both can apply either to individual applications or to interwindow functions and can get quite complicated—a ready-to-run script, the SSG demo, is a hilarious five minutes of flashing menus and prompts glimpsed between sample screens, as WindowMaster runs up and down its ladders of submenus invoking various functions.

Another bonus is that WindowMaster contains a pretty good business graphics program, which can send seven kinds of artwork—single, clustered and stacked bars plus line, scatter, mountain and pie charts—to screen, disk or the IBM/Epson graphics printer or HP 7470A plotter.

The program is a little awkward, heavy on data entry and with a half-dozen default questions to answer before you can see your work on screen, but the charts look good (even if the fields for bar names are so long that names can overlap on screen).

For an extra $200, you can have WindowMaster bundled with SSG's applications Word Right, Magic Worksheet and NAD (the name and address database). They're CP/M-86 programs, configured to work only from within WindowMaster; I didn't work with them long enough to write a review, but I wasn't impressed. They're slow (screen displays lag behind keystrokes), and the arrow keys produce capital letters instead of cursor movement. Moving up, down, left or right requires using the control key with E, X, S and D, respectively.

### Looking Beyond Windows

I know that integrated software is all the rage, but before I pass judgment on WindowMaster, I should admit that I'm not sure what people see in windows. I found myself using about half or a third of WindowMaster's capabilities, running two or three programs with full-sized displays (alternating whole screens, each with a cursor, instead of different small windows with single or double borders).

When I wanted to move some text or numbers from one document to another, I cut and pasted the windows to fit and used the unfiltered transfer routine. Basically, what I liked best was having access to two documents in progress without having to close one, exit to DOS, start the other program and open the other file. Once I memorized the half-dozen keystrokes mentioned above, it was easy; and, used in this unambitious way, WindowMaster is superb.

When I tried some other things, it occasionally crashed. Notably, WindowMaster is supposed to be multitasking, letting you work with one program in the foreground while another handles a time-consuming task, such as sorting a file. I believe the feature works with plain vanilla MS DOS programs; my acid test was a word count with pfs:Write, which I set in motion before switching to a spreadsheet.

> Before I pass judgment on WindowMaster, I should admit that I'm not sure what people see in windows.

On the first try, the count stopped as soon as I hit Alt-F1 for the WindowMaster menu; when I returned to pfs:Write a few minutes later, the count resumed where it had left off. Studying the manual, I learned WindowMaster normally "puts [a DMA video] program to sleep" when it's not in the active window, but, if I wanted "the option of running [such a program] in a background window," I could start it with the DMA option from the Advanced Functions submenu.

When I tried that, the results were spectacular: With the word count running, pfs:Write stayed put while I turned on the spreadsheet, showing both on the screen at once. The keyboard responded to spreadsheet input, but my workspace, following the word count cursor, scrolled rapidly up and out of sight. pfs:Write may be an oddball program, but I can't give full marks to WindowMaster's multitasking abilities.

Hangups like that, plus the prospect of other products due on the market, keep me from recommending WindowMaster as more than a sort of multiple program container or very handy hard disk DOS—and I suspect, despite the economical appeal of using existing programs, that's the best you can do without waiting for one of the truly integrated packages.

For now, WindowMaster is worth looking at, if you decide you want windows. I think that's as big a decision as choosing SSG instead of VisiCorp or Microsoft.■

**Manufacturer:** Structured Systems Group, 5204 Claremont, Oakland, CA 94618.
**Price:** $295 ($495 with applications).
**Requirements:** IBM PC or compatible; MS DOS 2.x; 256KB RAM (hard disk, 512KB RAM and graphics board recommended).

*Address correspondence to Eric Grevstad, c/o Microcomputing, 80 Pine St., Peterborough, NH 03458.*

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# Getting into Integer Basic

*What began as a search for a faulty RAM chip on the Apple's motherboard developed into a hunt for hidden treasures in Integer Basic. The author discovered a RAM test program, a music program and a renumber program.*

By Paul J. Boudreaux

A treasure hunt is exciting, especially when you don't plan on it but stumble onto clues that drag you into it. This was the case when I began my search for a faulty RAM chip on the motherboard of my Apple II Plus.

### Slight Problem

What I needed was a program to test the 48KB of RAM in my Apple. This didn't appear to be a problem since I had a cassette tape of a machine language RAM test program (Apple Part No. A2T0006X). Unfortunately, after I moved up to disk drives, my tape recorder was relegated to supporting teenage rock music and it met an untimely fate. I then discovered that I had forgotten to transfer what I needed to disk. That's when things began to get a bit sticky.

In desperation, I recalled that the venerable Integer Apple II that I often use at the office had an optional ROM called the Programmer's Aid #1 (Apple part no. A2L0011). It plugged into the empty D0 socket on the motherboard. This ROM chip has a RAM test program on it that functions identically to the cassette version.

This didn't appear to be useful information until I realized that Programmer's Aid #1 occupied part of the memory space reserved for the Integer Basic and machine monitor operating system. IntBasic is the Integer Basic system supplied by Apple Computer Inc. on the DOS 3.3 master disk. It loads into Apple's Language Card, which is often called a RAM Card. I wondered if Apple created IntBasic by transferring the Integer Basic system of the Apple II from ROM to disk in order to save it on the language card. Was it possible that Programmer's Aid #1 was contained within IntBasic? All I had to do was load IntBasic into my RAM card. A quick check confirmed my suspicion. RAM test was there along with the other Programmer's Aid #1 programs. It was now only a question of how to get at and use these buried treasures within IntBasic.

### Treasure Hunt Starts

Those who own an Integer ROM Apple with a RAM card will have to replace FPBasic in the RAM card with IntBasic. An excellent article on how to do this was written by G. Little, "Introductory RAMcard Programming" in *Nibble*, Vol. 4/No. 8. Use a CALL-151 from RAM Applesoft Basic to preserve the DOS hooks and maintain RAM card control. Then use two direct monitor statements to the hexadecimal address C081 by typing C081, pressing the return key and repeating the process. (All addresses are in hexadecimal.) These two accesses will write-enable the RAM card. Use the command BLOAD INTBASIC, A$D000 to load IntBasic into the RAM card. Read-enable the RAM card by typing the monitor statement C080 and pressing return. Finally, enter the RAM Integer rather than the ROM-based Integer. This is done by entering 3D3G instead of the usual 3D0. Now the programs of IntBasic are available to those with Integer ROMs.

Apple II Plus systems with a RAM card don't require the above commands because IntBasic is automatically loaded into the RAM card when you run the Hello program on the DOS 3.3 master disk.

When I first tried to run the IntBasic RAM test, I used CALL -151 from Integer Basic to enter the monitor mode. This ensured that the operating system was still controlled by the RAM card and not the Applesoft ROMs on the motherboard. The RAM test initialization software is located at hexadecimal address D5BC. When I attempted to run the program, it refused to cooperate. A quick consultation with "Apple II Monitors Peeled" (Apple product no. D2L0013) suggested that instead of using CALL -151 to enter the monitor mode, CALL -167 might work. This warm monitor start preserves the Text mode and is an alternate monitor entry point. It worked! Best of all, not only was the RAM test program now available, but so were the other Programmer's Aid #1 programs as well.

### RAM Test

The procedure to run the IntBasic RAM test is straightforward. First, boot the 16KB RAM card with IntBasic and enter the RAM-based Integer Basic. Second, use CALL-167 to enter

the machine code monitor. An asterisk will appear on the screen. Third, initialize the RAM test program by typing D5BCG and pressing return. The asterisk will reappear in a moment, signifying that the program commands are ready for entry.

There are two possible test modes, a one-time pass mode and a repeating test mode. The descriptions that follow are for a 48KB Apple II or II Plus. For the one-time pass, enter the following characters continuously as indicated without a space between them. Note that Control-Y stands for pressing the control key while hitting the Y key—it should not be typed out literally.

400.4(Control-Y)800.8(Control-Y)1000.10 (Control-Y)2000.20(Control-Y)3000.20(Control-Y) 4000.40(Control-Y)7000.2(Control-Y)8000.40 (Control-Y)(return)

The repeating test has a similar entry except the commands are preceded by N and followed by the characters 34:0 and a space before the return:

N400.4(Control-Y)800.8(Control-Y)1000. 10(Control-Y)2000.20(Control-Y)3000.20 (Control-Y)4000.40(Control-Y)7000.20(Control-Y)8000.40(Control-Y)34:0(space)(return)

The screen will fill with at signs (@) and then asterisks (*), followed by a single beep from the Apple speaker. As each consecutive block of RAM is tested, an additional beep will sound. Control will be returned to the machine monitor, and a single asterisk will appear with the cursor at the completion of the one-time test. For the continuous or automatically repeating test, the test cycle will begin again until terminated by the Reset command from the keyboard. A single pass of this test through 48KB of RAM takes about four minutes.

Individual blocks of memory can also be tested. Apples with less than 48KB of memory for individual rows of RAM chips can be tested by referring to Table 1 and Table 2 for the proper command sequence. Remember, when you enter commands from these tables, don't enter a space between command statements. Only the continuous test requires that one space be entered before the return key is pressed. The Control-Y command isn't displayed.

Simple and dynamic errors are searched for during the RAM test program. In the simple error test, a byte of data is stored at a memory address. The address is then read to verify that the data stored there is correct. Should an error be detected, the Apple will beep three times and display the following hex format:

(Memory error address) (Data written) (Data read) ERR (Row-Column).

An example would be

2116 01 11 ERR D - 7.

The number 2116 is the hexadecimal memory address where the faulty 11 was found instead of the correct value, 01. The error occurred in the 16KB RAM chip located at row D, column 7, on the motherboard. Consult your Apple reference manual for the chip row and column designations.

The dynamic test checks for errors due to the interaction of one memory address with the data stored at another. If an error is detected, the machine beeps and displays the following different hex format:

(Memory error address) (Data written) (Data read) (Current memory address) (Current correct data) ERR (Row-Column).

This is similar to the simple error test except that the current memory address and its correct data are also displayed in addition to the detected error and its address. An example of this type would be

4F00 00 01 5F00 00 ERR E - 6.

A few points should be emphasized concerning the RAM test program. In the dynamic error check, a small but finite probability exists that the chip row where the error occurred may be off by one. The column will be correct. When the test finds an error near the edge of the RAM block, it may falsely indicate that the adjacent RAM block has the error. This is easily verified by swapping adjacent RAM chips. Be sure to turn off the power and ground yourself before removing any chips from the motherboard to prevent electrostatic discharge from damaging anything.

This test doesn't operate on the memory below address 400. This area of RAM is required by the CPU and the machine won't operate if this part of RAM is defective. Swapping row C chips with any other row will allow you to test this area.

Routine or periodic use of the RAM test program is good preventive maintenance. RAM chips, or for that matter any chip, sometimes loosen in their sockets and tarnish due to vibration and thermal cycling. This causes poor electrical contact and can show up as a bad chip. Often simply reseating the chip in the socket will repair this problem. If the tarnish is severe, cleaning with an eraser may help. Take precautions against static discharge. I have found my ROMs need this cleaning once in a while. Running the RAM test program can save you a costly trip to the computer repair shop. There are many excellent diagnostic programs for the Apple, but I think for the price you can't beat the IntBasic RAM test!

| Row | Memory Address Range | Memory Map |
|---|---|---|
| C | $0000–$3FFF | 0–16 KB |
| D | $4000–$7FFF | 17–32 KB |
| E | $8000–$BFFF | 33–48 KB |

*Table 1. RAM chip memory ranges.*

| Command Statement | RAM Area Tested |
|---|---|
| 400.4(Control-Y) | Screen Memory |
| 800.8(Control-Y) | 0–16 KB, Row C |
| 1000.10(Control-Y) | 0–16 KB, Row C |
| 2000.20(Control-Y) | 0–16 KB, Row C |
| 4000.40(Control-Y) | 17–32 KB, Row D |
| 8000.40(Control-Y) | 33–48 KB, Row E |
| 3000.20(Control-Y) | 16, 32 KB Boundary |
| 7000.20(Control-Y) | 32, 48 KB Boundary |

*Table 2. RAM test command statements.*

## Renumber

Also present within IntBasic is the Renumber program. This machine code routine will renumber the lines in an Integer Basic program already loaded in memory. Follow these simple instructions to entirely renumber a program: First, clear the Basic variable table by entering the CLR

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command in the immediate mode. Enter the line number that you want the new program to begin with, e.g., 10000, as START = 10000. This is also an immediate command. Next enter the step between sequential lines, e.g., 10, as STEP = 10. Now use CALL -10531 to begin the renumbering process. A list of the old line numbers with their new assignments will appear on the screen.

If you wish to renumber only a portion of an already loaded program, use the additional direct statements:

FROM = (line number to begin renumbering within your program)
TO = (line number to stop renumbering within your program).

After you have entered the start and step values as above, use CALL -10521 to renumber the defined portion of your program. Be sure to verify any computed expressions used in a Goto or Gosub statement. They may not be correct. A RANGE ERR message indicates a problem. This is usually caused by attempting to change the order of the program. Table 3 summarizes Renumber commands.

### Append from Tape

Append is another program found within IntBasic. It will join a program already loaded in memory with one loaded from a tape cassette. This latter requirement severely hampers the usefulness of this program for those with disk I/O. Modifying this routine to handle disk I/O looks like an interesting task for a rainy day.

The two programs to be joined have to meet a simple requirement. The program already in memory must contain only line numbers larger than those to be loaded from the tape cassette. Renumber can be used to meet this requirement. Use a direct CALL -11076 to load the cassette tape program instead of the Integer Basic Load command. If a MEM FULL ERR occurs, use a direct CALL -11059 to recover the original program.

### Note the Music

Music is also a machine language program located within IntBasic. It's accessible from Integer Basic through various pokes to specific locations. The program produces musical tones through the Apple speaker. Three locations—Pitch, Time and Timbre—define the properties of the note. Placing values in these locations and using the Call Music statement play a note. PITCH = 767, TIME = 766, TIMBRE = 765 and

1. Entire Integer Basic program renumbered:
CLR
START = (Beginning line number of program)
STEP = (Interval between successive lines)
CALL -10531 (Begins renumbering entire program)
2. Partial renumbering of a loaded program:
CLR
START = (Beginning line number of program)
STEP = (Interval between successive lines)
FROM = (Starting line within program)
TO = (Ending line within program)
CALL -10521 (Begins renumbering a portion of program)

*Table 3. Renumber command statements.*

```
 10   MUSIC=-10473: PITCH=767: TIME=766: TIMBRE=765
 20   FOR TI=1 TO 150 STEP 25
 30   POKE TIME,TI
 40   POKE TIMBRE,32
 50   FOR PI=0 TO 50 STEP 5
 60   POKE PITCH,PI
 70   CALL MUSIC
 80   NEXT PI
 90   NEXT TI
100   END
```

*Listing 1. Integer Basic Music demonstration program.*

MUSIC = -10473 are the specific decimal addresses.

One of the 50 possible tones can be poked into location Pitch. These values range from one to 50. A value of zero produces a rest or silence instead of a tone. Middle C is approximately 32 and 33 is near C sharp. The duration of the tone is determined by a value of from one to 255 poked into Time. One second of play is roughly equal to the value of 170. There are five values for the Timbre: 2, 8, 16, 32 and 64. A timbre of 32 is the most accurate for musical tones.

Once selected values are poked into their respective locations, the command CALL MUSIC will play the note. Listing 1 is a sample demonstration.

### Other Programs

In addition to the above programs, there's a tape verify program for Basic and a tape verify program for machine code and data. The tape verify program for Basic is applied after an Integer program is saved on tape. Use CALL -10955 instead of the load command. Start the tape and then press return. The lack of error messages indicates a good tape.

Data or machine code is verified through the monitor mode. Save the code in the usual way for tape—address1.address2W. Initialize the program by entering address1.address2 (Control-Y), pressing return and replaying the tape. As before, start the tape and then press return.

In addition to the above, high-resolution graphics is also present on IntBasic. The key locations are given in Table 4. You can refer to the *Apple Software Bank, Contributed Programs, Volume 3–5* for a description of Integer High-Resolution Graphics (Apple product no. A2L0014). If this isn't readily available, an article in the May 1980 issue of *Microcomputing* ("An Easy Way to Apple Hi-Res Graphics" by M. Clark, pp. 222–224) may help to get you started.

### Searcher's Reward

IntBasic has done more than just place Integer Basic on the RAM card. It has allowed you to explore the hidden mysteries of this remarkable software. I am not the first, nor am I the last, to find hidden treasures in the wonderful world of Apple. I hope that by sharing this discovery with you, you too will enjoy the thrill of finding buried treasure. After all, who knows what might have been in the other Apple II socket, D8, when IntBasic was made!■

*Address correspondence to Paul J. Boudreaux, 7000 Nightingale Terrace, Lanham, MD 20706.*

| Subroutine | CALL Address |
|---|---|
| INIT | -12288 |
| POSN | -11527 |
| FIND | -11780 |
| CLEAR | -12274 |
| PLOT | -11506 |
| DRAW1 | -11462 |
| SHLOAD | -11335 |
| BKGND | -11471 |
| LINE | -11500 |
| DRAW | -11465 |

*Table 4. Integer High-Resolution Graphics subroutine entry points.*

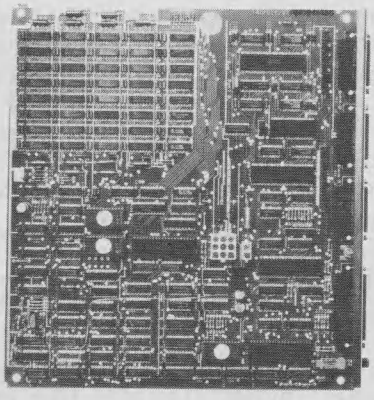
Circle 269 on Reader Service card.

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# Another PROM Programmer?

*No, this* isn't *just another PROM programmer. This one is simple, cheap, doesn't take a slot on your computer and the only interface requirement is a serial RS-232C I/O port.*

By Stuart R. Ball

Here's another PROM programmer. How is this one different from any others? Well, for one thing, this PROM programmer won't take up a slot on your computer and require the cover to be left off of your machine. This programmer uses an RS-232C serial I/O port, which most computers already have. It doesn't need a 32-line parallel port to provide an interface. The programmer doesn't have a built-in microprocessor; it doesn't have any complex error checking and it doesn't even verify any check sums. It is, however, simple and cheap.

The programmer consists of a power supply, a UART (universal asynchronous receiver/transmitter and some counters (see Fig. 1). The only interface requirement is a serial RS-232C interface that can transmit eight bits of data at 300 bits per second (bps). The only concession to complexity is the ability to expand to different PROMs via an expansion connector.

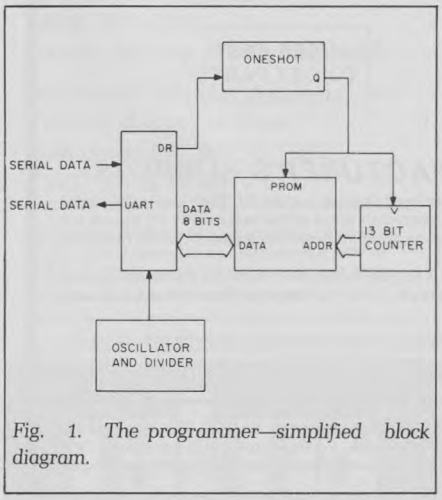



*Fig. 1. The programmer—simplified block diagram.*

## A Simple Operation

Circuit operation is very simple. S1 resets the counters in the programmer, and S3 turns on the programming voltage, Vpp. As each byte of data is received by the UART, a 50 ms one-shot is triggered that produces a pulse to the PROM to program. After a byte is programmed, the counters advance to the next address to be programmed. This repeats until the host computer stops sending bytes of data to the programmer. Switch S2 causes the programmer to begin transmitting the PROM data back to the host computer. After each byte is transmitted, the address counters are incremented.

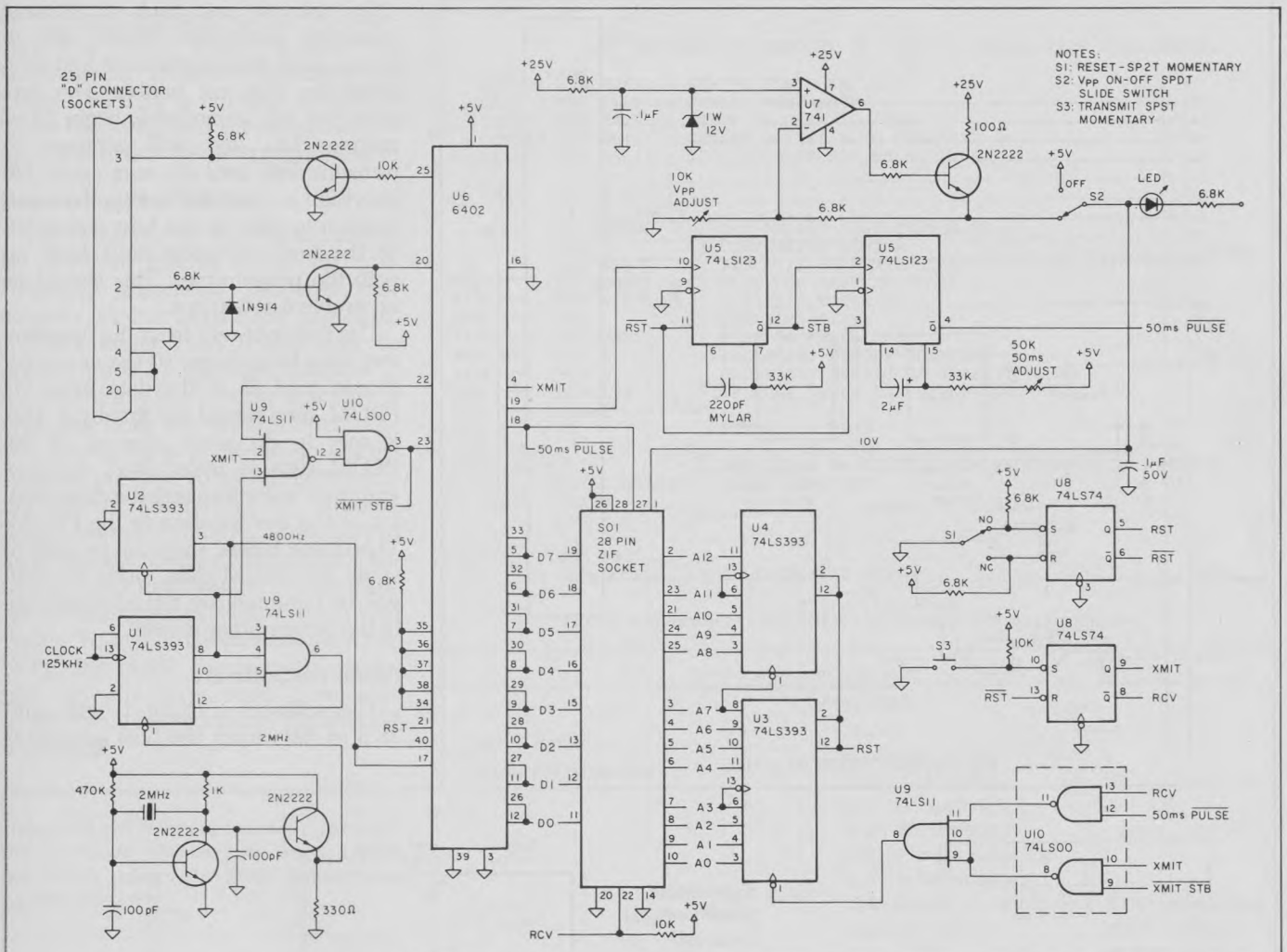
The data rate is 300 bps, which lets most modem ports be used with the programmer. A faster rate wouldn't gain anything, since a 2700 series PROM needs 50 ms per location to program anyway. The one type of computer that the programmer will not work with is one that can only send ASCII (seven-bit) data over the serial port, since the programmer programs in eight-bit bytes.

The UART used is a 6401 CMOS type, but other 40-pin UARTs should work, with modifications ranging from none to major. The programmable UARTs (such as the 6850) won't work, as there's no computer to initialize and program them.

The schematic shown for the programmer, Fig. 2, includes SO1, a 28-pin ZIF (zero-insertion force) socket. This socket is wired to program a 2764 8K × 8 EPROM. (A non-ZIF socket could be used here, but it wouldn't last long.)

The programmer can transmit the PROM data back to the host computer at 300 bps. Once the programmer starts transmitting, it doesn't stop until it's reset. Therefore, the host computer must know how many bytes it expects to receive and stop receiving data at the proper place. The data sent from the programmer is not actually RS-232C, since it swings only from 0V to 5V. This voltage swing is adequate for most RS-232C line receivers. If the serial port on your computer requires actual RS-232C signal levels, it will be necessary to add an RS-232C driver to the circuit. This modification will also require a negative power supply to provide power for the line driver.

The second schematic, Fig. 3, is a programming module for the 2716 EPROM and for a 5V-only EEPROM. The programming voltage is only 21V (the spec for a 2716 calls for 25V), but the EPROMs seem to program fine with that voltage. The connector on the module mates with the 32-pin field on the programmer (see Fig. 4). When programming EEPROMs with the module, it's a good idea to place the 2716/EEPROM switch into the 2716 position before turning power on or off. This ensures that the write



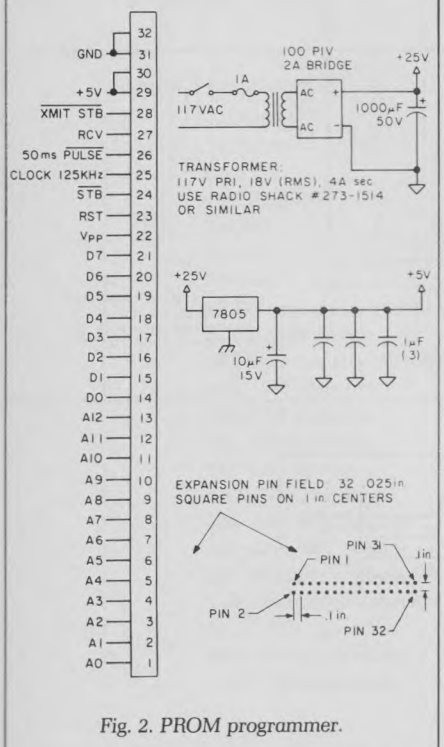




*Fig. 2. PROM programmer.*

line on the EEPROM is not pulsed by power transients in the logic.

The last schematic, Fig. 5, is for an optional digital one-shot, which will be explained in the adjustments section below.

### Minor Adjustments

The only adjustments that need to be made on the programmer are the Vpp voltage and the 50 ms pulse width. To change the Vpp voltage, adjust the Vpp set potentiometer until Vpp is equal to 21V. To adjust the pulse width, continuously send data from the host computer at a rate of 60 ms per byte. Then adjust the pulse width potentiometer until the pulse width is 45-55 ms. (You need an oscilloscope to adjust the pulse width.) If you don't have an oscilloscope, you can build the programmer using the optional digital one-shot (see the last schematic) in place of U5. This requires two more ICs, but it doesn't require adjustment of the pulse width.

The 2716/EEPROM module only needs to have the ten ms pulse width adjusted. To adjust the pulse width, send data from the host computer and adjust the potentiometer on the module until the width of the pulse from the one-shot is ten ms. If the module will only be used to program 2716s and not EEPROMs, the ten ms pulse width doesn't need to be adjusted, as it's not used for the 2716 EPROM.

### Programmer in Action

The programmer is simple to use. After inserting the PROM to program and turning power on, press the reset button. This resets the programmer counters. The Vpp voltage should then be turned on, and the data to be programmed should be sent from the host computer. After sending each byte, the computer waits about 50 ms to give the PROM time to program. When the entire PROM is programmed, turn off the Vpp and the power and remove the PROM.

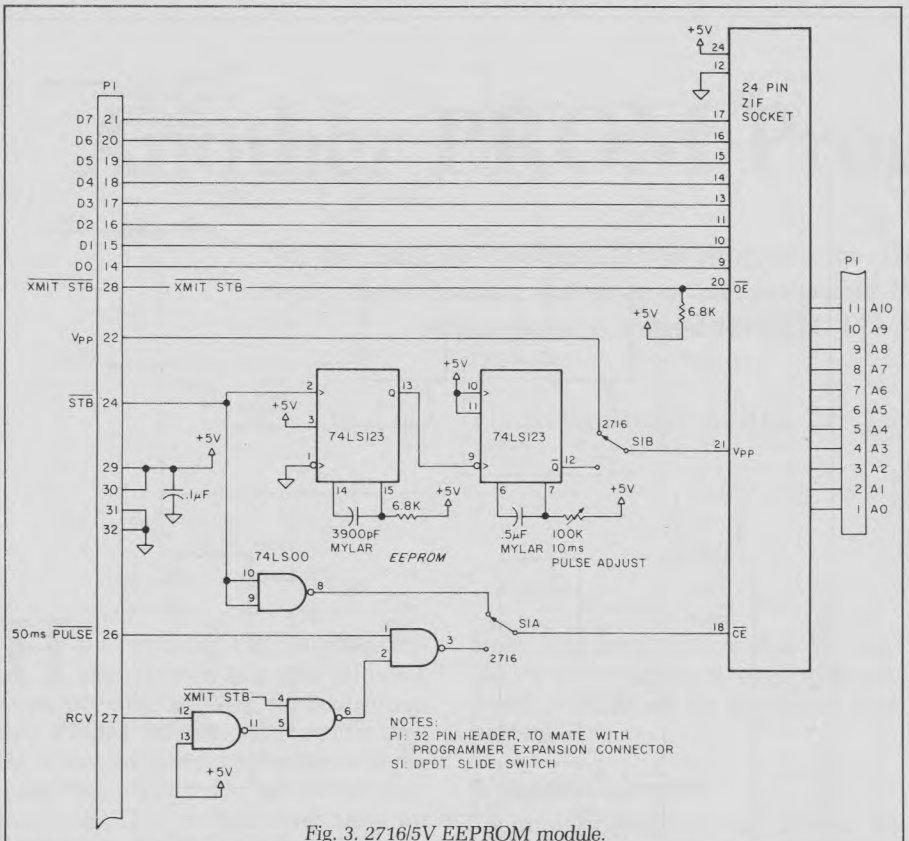



*Fig. 3. 2716/5V EEPROM module.*

To transmit data back to the host computer (with the PROM still in place), reset the programmer and then press the transmit button. The programmer will immediately begin transmitting data and will continue to transmit data until it's reset again. No provision is made for halting the transmission to wait on the host computer, so the host computer must keep up with the programmer. This should be no problem at 300 bps.

The first byte sent from the programmer may be garbage, so the computer should read all of the data from the PROM, then reread the first byte. This is easy to do, since after all of the PROM data is transmitted, the programmer will retransmit the data, starting at the first location in the PROM. This characteristic may also be used to verify the PROM data, since the data will be continuously retransmitted until the programmer is reset.

### About the Software

The software (Listing 1) will send 2KB of data from the host computer

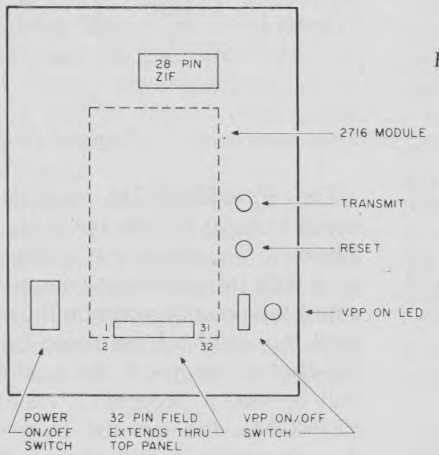
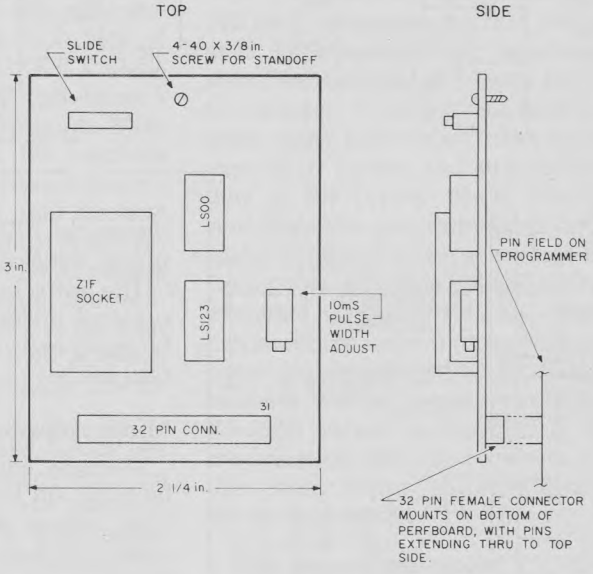



*Fig. 4. Approximate programmer top layout and 2716/EEPROM module configuration.*



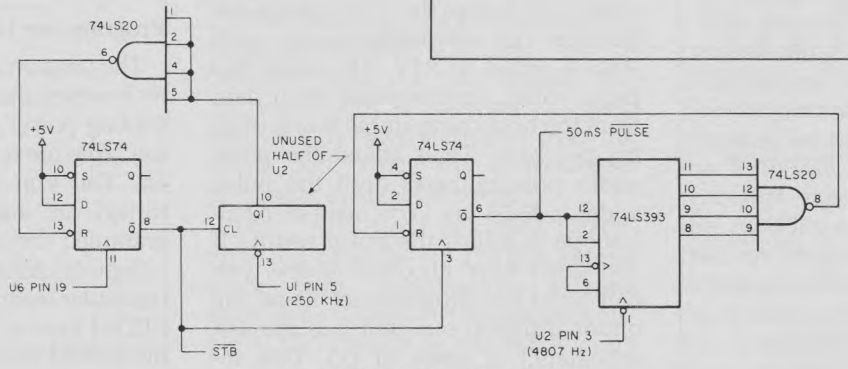




*Fig. 5. Optional digital one-shot.*

(at location 100 hex) to the programmer. The code is written in assembly language for an 8080/8085/Z80 computer. The data is complemented because the serial port on my computer inverts the data before transmitting it.

### Expansion Possible

The programmer may be expanded to different PROM types by constructing expansion modules that connect to the expansion pin field. PROMs larger than 8K×8 may be programmed by adding a counter to the module and clocking it with the A12 line from the programmer. The 125 kHz clock is provided on the expansion pin field to allow digital timing chains (similar to the optional digital one-shot mentioned earlier) to be used instead of R-C one-shots. This can be used to eliminate the need for an oscilloscope to adjust the pulse width. To avoid bus contention while in receive mode, the transmit strobe line on the expansion connector should be used to enable the PROM outputs.■

Note: Any or all of the parts needed to construct this circuit are available from Barton Digital, 999 44th St., Marion, IA 52302. Request price list #30714-01.

*Address correspondence to Stuart R. Ball, 1101 Dover N.E., Cedar Rapids, IA 52402.*

```
                ; SOFTWARE TO SEND 2K OF DATA TO SERIAL PROM PROGRAMMER.
                ;
STATUS  EQU 0E4H  ; SERIAL PORT STATUS
DATA    EQU 0E5H  ; SERIAL PORT DATA
START   EQU 100H  ; START OF DATA TO SEND
LENGTH  EQU 2048  ; NUMBER OF BYTES TO TRANSMIT
DELAY   EQU 6667H ; LOOP COUNTER FOR 50 MS DELAY
                ;
INIT    LXI H,START
        LXI B,LENGTH
LOOP    IN STATUS     ; GET SERIAL PORT STATUS TO A
        CMA           ; COMPLEMENT STATUS
        ANI 02H       ; BIT 1 IS TRANSMIT READY FLAG, 1= READY TO XMIT
        JZ LOOP       ; WAIT FOR XMITTER READY
        MOV A,M       ; GET BYTE TO XMIT
        CMA           ; COMPLEMENT IT
        OUT DATA      ; SEND TO PROGRAMMER
        INX H         ; INCREMENT MEMORY POINTER
        DCX B         ; DECREMENT NUMBER OF BYTES TO SEND
        MOV A,B       ; IF BC=0, THEN ALL BYTES HAVE BEEN SENT
        ORA C
        RZ            ; RETURN IF DONE
                      ;
                      ; NOW DELAY 50 MS TO ALLOW PROGRAMMER TO PROGRAM
        LXI D,DELAY   ; DELAY CONSTANT
WAIT    DCX D
        MOV A,D
        ORA E
        JNZ WAIT
        JMP LOOP      ; GO XMIT NEXT BYTE
```

*Listing 1. Software to send 2KB of data to serial PROM programmer.*

*Table 2. Parts list—2716/EEPROM module.*

| | | |
|---|---|---|
| 1 | 74LS123 | |
| 1 | 74LS00 | |
| 1 | 24-pin ZIF socket | |
| 1 | DPDT slide switch | S1 |
| 2 | 6.8k, ¼W resistor | |
| 1 | .1 μF, 50V capacitor | bypass |
| 1 | 3900 pF mylar capacitor | |
| 1 | .5 μF mylar capacitor | |
| 1 | 100k, 10-turn potentiometer | 10 ms pulse adjust |
| 1 | 32-pin connector | use AP products #929975 and cut to 32 pins |

Misc: IC sockets, wire, perforated breadboard

| Quantity | Description | Comments | Quantity | Description | Comments |
|---|---|---|---|---|---|
| 4 | 74LS393 | U1–U4 | 2 | 100 pF, 50V capacitors | |
| 1 | 74LS123 | U5 | 1 | 10k, 10-turn potentiometer | Vpp adjust |
| 1 | 6402 | U6 | 1 | 50k, 10-turn potentiometer | 50 ms adjust |
| 1 | 741 op amp | U7 | 5 | 2N2222 transistors | |
| 1 | 74LS74 | U8 | 1 | 2 MHz crystal | |
| 1 | 74LS11 | U9 | 1 | 1N914 diode | |
| 1 | 74LS00 | U10 | 1 | transformer | |
| 1 | SP2T momentary switch | S1 | 1 | bridge rectifier | see schematic |
| 1 | SPDT slide switch | S2 | 1 | 12V 1 W Zener | just about anything from 10V–15V will do |
| 1 | SPST momentary switch | S3 | | | |
| 10 | 6.8k, ¼W resistors | | 1 | 7805 5V regulator use heat sink | |
| 3 | 10k, ¼W resistors | | | | |
| 2 | 33k, ¼W resistors | | 1 | LED | just about anything will work |
| 1 | 1k, ¼W resistor | | | | |
| 1 | 470k, ¼W resistor | | 1 | 32-pin field | use AP products #923864-R and cut to 32 pins |
| 1 | 330 ohm, ¼W resistor | | | | |
| 1 | 100 ohm, ¼W resistor | | | | |
| 1 | 220 pF mylar capacitor | | 1 | 28-pin ZIF socket | |
| 1 | 2 μF electrolytic capacitor | | | miscellaneous parts: perforated breadboard, sockets, wire, fuse and holder | |
| 1 | 10 μF, 15V capacitor | | | | |
| 1 | 1000 μF, 50V capacitor | | | | |
| 5 | .1 μF, 50V capacitors | bypass | | | |

*Table 1. Parts list—Programmer.*

# What Lurks In Your Laptop?

By Ray Albrektson

Ever wonder what lurks inside the ROM of your NEC 8201 or your Radio Shack Model 100 portable? If so, this program's for you. It's a quick-and-dirty disassembler that will print a listing of your portable's brains.

To use the program, simply supply it with the beginning and ending addresses, in decimal form, of the memory area you want to look at. The program will then output the disassembly to your computer's RS-232C port. (If your printer isn't hooked up to your serial port, you'll need to modify line 40. Also, Model 100 owners must remember to add the necessary protocol parameters after the word COM: in line 40.)

Happy exploring!■

*Address correspondence to Ray Albrektson, ACPO Box 51, Quezon City 3001, Philippines.*

*Listing 1. Translation of Quick & Dirty Disassembler.*

```
10 'Translation of "A Quick & Dirty Disasembler"
20 'for the NEC PC-8201A using standard 8080 mnemonics
30 'By Ray Albrektson, ACPO Box 51, Quezon City 3001, Philippines
40 CLEAR 200:OPEN "COM:" FOR OUTPUT AS #1
50 DIM MNC$(256),A(256),CMT$(256)
60                              'READ ALL DATA INTO ARRAYS
70 FOR N = 0 TO 255: READ MNC$(N),A(N),CMT$(N):NEXT N:N=1
80                              'ENTER LIMITS TO DISASSEMBLE
90 INPUT"enter FIRST, LAST ";FIRST,LAST:PC=FIRST:IF LAST=0 THEN
   LAST=65536!
100                             'PRINT FF AT END OF PAGE
110 IF L=53 THEN PRINT #1,CHR$(12):L=0:P=P+1
120                             'GET HEX VALUE OF ADDRESS
130 BYTE =PC-256*(INT(PC/256)):GOSUB 360:B1$=B$
140 BYTE = PC/256:GOSUB 360:B2$=B$
150 HEX$=B2$+B1$
160                             'GET DECIMAL VALUE OF ADDRESS
170 DEC$=RIGHT$(STR$(PC),LEN(STR$(PC))-1)
180 IF LEN(DEC$)<4 THEN DEC$="0"+DEC$:GOTO 180
190 BYTE=PEEK(PC)               'GET VALUE OF CURRENT ADDRESS
200 GOSUB 410                   'FIND OUT IF BYTE IS PRINTABLE
210 GOSUB 360:BYTE$=B$          'CONVERT DECIMAL TO HEX
220 MNC$=MNC$(BYTE)             'LOOK UP MNEMONIC
230 CMT$=CMT$(BYTE)             'LOOK UP COMMENT
240 A=A(BYTE)                   'A = NUMBER OF BYTES IN INSTRUCTION
250                             'FORMAT 2 & 3 BYTE INSTRUCTIONS
260 IF A=3 THEN BYTE=PEEK(PC+2):GOSUB 410:GOSUB360:MNC$=MNC$+
    " "+B$:T$=B$:BYTE=PEEK(PC+1):GOSUB 360:GOSUB 410:MNC$=MNC$+
    B$:BYTE$=BYTE$+B$+T$:PC=PC+2:GOTO 310
270 IF A=2 THEN BYTE=PEEK(PC+1):GOSUB360:GOSUB 410:MNC$=MNC$+
    " "+B$:BYTE$=BYTE$+B$:PC=PC+1:GOTO 310
280                             'FORM MNEMONIC STRING
290 MNC$=MNC$+" "+RIGHT$(BYTE$,LEN(BYTE$)-2)
300                             'FORMAT & PRINT A LINE
310 PRINT #1, DEC$;"  ";HEX$;"  ";BYTE$;SPACE$(7-LEN(BYTE$));
    MNC$;SPACE$(10-LEN(MNC$));CMT$;SPACE$(19-LEN(CMT$));AS$
320 PC=PC+1:L=L+1:AS$=""        'UPDATE ADDRESS & LINE COUNTER
330 IF LAST>PC THEN GOTO 110  'BACK FOR MORE
340 GOTO 90
350 '
360 'SUBROUTINE TO CONVERT BYTE TO HEX STRING (B$)
370 IF BYTE MOD 16>9THEN K$=CHR$(55+BYTE MOD 16) ELSE K$=
    CHR$(48+BYTE MOD 16)
380 IF INT(BYTE/16)>9 THEN J$=CHR$(55+INT(BYTE/16)) ELSE J$=
    CHR$(48+INT(BYTE/16))
390 B$=J$+K$:RETURN
400 '
410 'SUBROUTINE TO CHECK IF BYTE IS ASCII PRINTABLE
420 IF BYTE>32 AND BYTE<126 THEN AS$=AS$+CHR$(BYTE)
    ELSE AS$=AS$+"-"
```

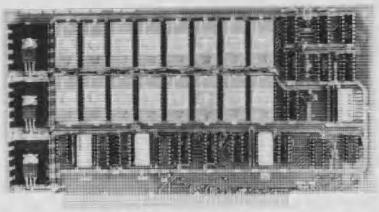
*Listing continued.*

*Listing continued.*

```
430 RETURN
999 'OPCODE TABLE FOR 8080 CPU
1000 DATA NOP,1,No-operation
1001 DATA LXI B,3,Load Imm B&C
1002 DATA STAX B,1,Store A via B
1003 DATA INX B,1,Increment B&C
1004 DATA INR B,1,Increment B
1005 DATA DCR B,1,Decrement B
1006 DATA MVI B,2,Move Imm to B
1007 DATA RLC,1,Rotate A left
1008 DATA 00,1,--
1009 DATA DAD B,1,Add B&C to H&L
1010 DATA LDAX B,1,Load A via B
1011 DATA DCX B,1,Decrement B&C
1012 DATA INR C,1,Increment C
1013 DATA DCR C,1,Decrement C
1014 DATA MVI C,2,Move imm to C
1015 DATA RRC,1,Rotate A right
1016 DATA 00,1,--
1017 DATA LXI D,3,Load imm D&E
1018 DATA STAX D,1,Store A via D
1019 DATA INX D,1,Increment D&E
1020 DATA INR D,1,Increment D
1021 DATA DCR D,1,Decrement D
1022 DATA MVI D,2,Move imm to D
1023 DATA RAL,1,Rotate A Left
1024 DATA 00,1,--
1025 DATA DAD D,1,Add D&E to H&L
1026 DATA LDAX D,1,Load A via D
1027 DATA DCX D,1,Decrement D&E
1028 DATA INR E,1,Increment E
1029 DATA DCR E,1,Decrement E
1030 DATA MVI E,2,Move imm to E
1031 DATA RAR,1,Rotate A right
1032 DATA 00,1,--
1033 DATA LXI H,3,Load Imm H&L
1034 DATA SHLD,3,Store H&L direct
1035 DATA INX H,1,Increment H&L
1036 DATA INR H,1,Increment H
1037 DATA DCR H,1,Decrement H
1038 DATA MVI H,2,Move Imm to H
1039 DATA DAA,1,Decemal adjust A
1040 DATA 00,1,--
1041 DATA DAD H,1,Add HL to HL
1042 DATA LHLD,3,Load HL direct
1043 DATA DCX H,1,Decrement HL
1044 DATA INR L,1,Increment L
1045 DATA DCR L,1,Decrement L
1046 DATA MVI L,2,Move imm to L
1047 DATA CMA,1,Complement A
1048 DATA 00,1,--
1049 DATA LXI SP,3,Load Imm SP
1050 DATA STA,3,Store A direct
1051 DATA INX SP,1,Increment SP
1052 DATA INR M,1,Increment M
1053 DATA DCR M,1,Decrement M
1054 DATA MVI M,2,Move Imm to M
1055 DATA STC,1,Set Carry
1056 DATA 00,1,--
1057 DATA DAD SP,1,Add SP to HL
1058 DATA LDA,3,Load A direct
1059 DATA DCX SP,1,Decrement SP
1060 DATA INR A,1,Increment A
1061 DATA DCR A,1,Decrement A
1062 DATA MVI A,2,Move imm to A
1063 DATA CMC,1,Complement carry
1064 DATA MOV B-B,1,Move B to B
1065 DATA MOV B-C,1,Move C to B
1066 DATA MOV B-D,1,Move D to B
1067 DATA MOV B-E,1,Move E to B
1068 DATA MOV B-H,1,Move H to B
1069 DATA MOV B-L,1,Move L to B
1070 DATA MOV B-M,1,Move M to B
1071 DATA MOV B-A,1,Move A to B
1072 DATA MOV C-B,1,Move B to C
1073 DATA MOV C-C,1,Move C to C
1074 DATA MOV C-D,1,Move D to C
1075 DATA MOV C-E,1,Move E to C
1076 DATA MOV C-H,1,Move H to C
1077 DATA MOV C-L,1,Move L to C
1078 DATA MOV C-M,1,Move M to C
1079 DATA MOV C-A,1,Move A to C
1080 DATA MOV D-B,1,Move B to D
1081 DATA MOV D-C,1,Move C to D
1082 DATA MOV D-D,1,Move D to D
1083 DATA MOV D-E,1,Move E to D
1084 DATA MOV D-H,1,Move H to D
1085 DATA MOV D-L,1,Move L to D
1086 DATA MOV D-M,1,Move M to D
1087 DATA MOV D-A,1,Move A to D
1088 DATA MOV E-B,1,Move B to E
1089 DATA MOV E-C,1,Move C to E
1090 DATA MOV E-D,1,Move D to E
1091 DATA MOV E-E,1,Move E to E
1092 DATA MOV E-H,1,Move H to E
1093 DATA MOV E-L,1,Move L to E
1094 DATA MOV E-M,1,Move M to E
1095 DATA MOV E-A,1,Move A to E
1096 DATA MOV H-B,1,Move B to H
1097 DATA MOV H-C,1,Move C to H
1098 DATA MOV H-D,1,Move D to H
1099 DATA MOV H-E,1,Move E to H
1100 DATA MOV H-H,1,Move H to H
1101 DATA MOV H-L,1,Move L to H
1102 DATA MOV H-M,1,Move M to H
1103 DATA MOV H-A,1,Move A to H
1104 DATA MOV L-B,1,Move B to L
1105 DATA MOV L-C,1,Move C to L
1106 DATA MOV L-D,1,Move D to L
1107 DATA MOV L-E,1,Move E to L
1108 DATA MOV L-H,1,Move H to L
1109 DATA MOV L-L,1,Move L to L
1110 DATA MOV L-M,1,Move M to L
1111 DATA MOV L-A,1,Move A to L
1112 DATA MOV M-B,1,Move B to M
1113 DATA MOV M-C,1,Move C to M
1114 DATA MOV M-D,1,Move D to M
1115 DATA MOV M-E,1,Move E to M
1116 DATA MOV M-H,1,Move H to M
1117 DATA MOV M-L,1,Move L to M
1118 DATA HLT,1,Halt
1119 DATA MOV M-A,1,Move A to M
1120 DATA MOV A-B,1,Move B to A
1121 DATA MOV A-C,1,Move C to A
1122 DATA MOV A-D,1,Move D to A
1123 DATA MOV A-E,1,Move E to A
1124 DATA MOV A-H,1,Move H to A
1125 DATA MOV A-L,1,Move L to A
1126 DATA MOV A-M,1,Move M to A
1127 DATA MOV A-A,1,Move A to A
1128 DATA ADD B,1,Add B to A
1129 DATA ADD C,1,Add C to A
1130 DATA ADD D,1,Add D to A
1131 DATA ADD E,1,Add E to A
1132 DATA ADD H,1,Add H to A
1133 DATA ADD L,1,Add L to A
1134 DATA ADD M,1,Add M to A
1135 DATA ADD A,1,Add A to A
1136 DATA ADC B,1,Add B to A
1137 DATA ADC C,1,Add C to A
1138 DATA ADC D,1,Add D to A
1139 DATA ADC E,1,Add E to A
1140 DATA ADC H,1,Add H to A
1141 DATA ADC L,1,Add L to A
1142 DATA ADC M,1,Add M to A
1143 DATA ADC A,1,Add A to A
1144 DATA SUB B,1,Sub B from A
1145 DATA SUB C,1,Sub C from A
1146 DATA SUB D,1,Sub D from A
1147 DATA SUB E,1,Sub E from A
1148 DATA SUB H,1,Sub H from A
1149 DATA SUB L,1,Sub L from A
1150 DATA SUB M,1,Sub M from A
1151 DATA SUB A,1,Sub A from A
1152 DATA SBB B,1,Sub B from A
1153 DATA SBB C,1,Sub C from A
1154 DATA SBB D,1,Sub D from A
1155 DATA SBB E,1,Sub E from A
1156 DATA SBB H,1,Sub H from A
1157 DATA SBB L,1,Sub L from A
1158 DATA SBB M,1,Sub M from A
1159 DATA SBB A,1,Sub A from A
1160 DATA ANA B,1,And B with A
1161 DATA ANA C,1,And C with A
1162 DATA ANA D,1,And D with A
1163 DATA ANA E,1,And E with A
1164 DATA ANA H,1,And H with A
1165 DATA ANA L,1,And L with A
1166 DATA ANA M,1,And M with A
1167 DATA ANA A,1,And A with A
1168 DATA XRA B,1,Xor B with A
1169 DATA XRA C,1,Xor C with A
1170 DATA XRA D,1,Xor D with A
1171 DATA XRA E,1,Xor E with A
1172 DATA XRA H,1,Xor H with A
1173 DATA XRA L,1,Xor L with A
1174 DATA XRA M,1,Xor M with A
1175 DATA XRA A,1,Xor A with A
1176 DATA ORA B,1,Or B with A
1177 DATA ORA C,1,Or C with A
1178 DATA ORA D,1,Or D with A
1179 DATA ORA E,1,Or E with A
1180 DATA ORA H,1,Or H with A
1181 DATA ORA L,1,Or L with A
1182 DATA ORA M,1,Or M with A
1183 DATA ORA A,1,Or A with A
1184 DATA CMP B,1,Compare B & A
1185 DATA CMP C,1,Compare C & A
1186 DATA CMP D,1,Compare D & A
1187 DATA CMP E,1,Compare E & A
1188 DATA CMP H,1,Compare H & A
1189 DATA CMP L,1,Compare L & A
1190 DATA CMP M,1,Compare M & A
1191 DATA CMP A,1,Compare A & A
1192 DATA RNZ,1,Ret on no zero
1193 DATA POP B,1,Pop B
1194 DATA JNZ,3,Jump on no zero
1195 DATA JMP,3,Jump
1196 DATA CNZ,3,Call on no zero
1197 DATA PUSH B,1,PUSH B
1198 DATA ADI,2,Add imm to A
1199 DATA RST0,1,Restart 0
1200 DATA RZ,1,Ret on zero
1201 DATA RET,1,Return
1202 DATA JZ,3,Jump on zero
1203 DATA 00,1,--
1204 DATA CZ,3,Call on zero
1205 DATA CALL,3,Call
1206 DATA ACI,2,Add imm to A
1207 DATA RST1,1,Restart 1
1208 DATA RNC,1,Ret on no carry
1209 DATA POP D,1,Pop D
1210 DATA JNC,3,Jump on no carry
1211 DATA OUT,2,Out
1212 DATA CNC,3,Call on no carry
1213 DATA PUSH D,1,PUSH D
1214 DATA SUI,2,Sub imm to A
1215 DATA RST2,1,Restart 2
1216 DATA RC,1,Ret on carry
1217 DATA 00,1,--
1218 DATA JC,3,Jump on carry
1219 DATA IN,2,In
1220 DATA CC,3,Call on carry
1221 DATA 00,1,--
1222 DATA SBI,2,Sub imm to A
1223 DATA RST3,1,Restart 3
1224 DATA RPO,1,Ret on parity odd
1225 DATA POP H,1,Pop HL
1226 DATA JPO,3,Jump on parity odd
1227 DATA XTHL,1,Exchg stack & HL
1228 DATA CPO,3,Call on parity odd
1229 DATA PUSH H,1,PUSH HL
1230 DATA ANI,2,And imm with A
1231 DATA RST4,1,Restart 4
1232 DATA RPE,1,Ret on parity even
1233 DATA PCHL,1,Put HL in PC
1234 DATA JPE,3,Jump on parity even
1235 DATA XCHG,1,Swap DE & HL
1236 DATA CPE,3,Call on parity even
1237 DATA 00,1,--
1238 DATA XRI,2,Xor imm to A
1239 DATA RST5,1,Restart 5
1240 DATA RP,1,Return on positive
1241 DATA POP PSW,1,Pop A & flags
1242 DATA JP,3,Jump on positive
1243 DATA DI,1,Disable interrupts
1244 DATA CP,3,Call on positive
1245 DATA PUSH PSW,1,Push A & flags
1246 DATA ONI,2,Or imm with A
1247 DATA RST6,1,Restart 6
1248 DATA RP,1,Ret on minus
1249 DATA SCHL,1,Put HL in SP
1250 DATA JM,3,Jump on minus
1251 DATA EI,1,Enable interrupts
1252 DATA CM,3,Call on minus
1253 DATA 00,1,--
1254 DATA XCP,2,Compare Imm & A
1255 DATA RST7,1,Restart 7
```

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## 32K S-100 EPROM CARD
### PRICE CUT!



**$59.95**

USES 2716's

Blank PC Board - $34

ASSEMBLED & TESTED ADD $30

SPECIAL: 2716 EPROM's (450 NS) Are $4.95 Ea. With Above Kit.

KIT FEATURES:
1. Uses +5V only 2716 (2Kx8) EPROM's
2. Allows up to 32K of software on line!
3. IEEE S-100 Compatible
4. Addressable as two independent 16K blocks
5. Cromemco extended or Northstar bank select
6. On board wait state circuitry if needed
7. Any or all EPROM locations can be disabled
8. Double sided PC board, solder-masked, silk-screened
9. Gold plated contact fingers
10. Unselected EPROM's automatically powered down for low power
11. Fully buffered and bypassed
12. Easy and quick to assemble

## 64K S100 STATIC RAM

**$199.00 KIT**

**NEW!**

LOW POWER!

RAM OR EPROM!

BLANK PC BOARD WITH DOCUMENTATION $55

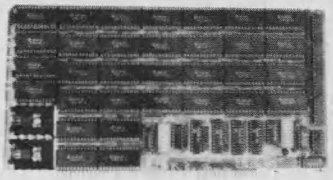
SUPPORT ICs + CAPS $17.50

FULL SOCKET SET $14.50

FULLY SUPPORTS THE NEW IEEE 696 S100 STANDARD (AS PROPOSED)

FOR 56K KIT $185

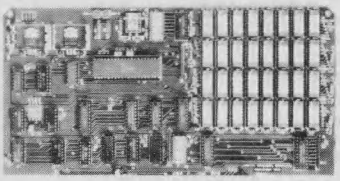
ASSEMBLED AND TESTED ADD $50



FEATURES:
- ★ Uses new 2K x 8 (TMM 2016 or HM 6116) RAMs.
- ★ Fully supports IEEE 696 24 BIT Extended Addressing.
- ★ 64K draws only approximately 500 MA.
- ★ 200 NS RAMs are standard. (TOSHIBA makes TMM 2016s as fast as 100 NS. FOR YOUR HIGH SPEED APPLICATIONS.)
- ★ SUPPORTS PHANTOM (BOTH LOWER 32K AND ENTIRE BOARD).
- ★ 2716 EPROMs may be installed in any of top 48K.
- ★ Any of the top 8K (E000 H AND ABOVE) may be disabled to provide windows to eliminate any possible conflicts with your system monitor, disk controller, etc.
- ★ Perfect for small systems since BOTH RAM and EPROM may co-exist on the same board.
- ★ BOARD may be partially populated as 56K.

## 256K S-100 SOLID STATE DISK SIMULATOR!

***WE CALL THIS BOARD THE "LIGHT-SPEED-100" BECAUSE IT OFFERS AN ASTOUNDING INCREASE IN YOUR COMPUTER'S PERFORMANCE WHEN COMPARED TO A MECHANICAL FLOPPY DISK DRIVE.***



FEATURES:
- ★ 256K on board, using + 5V 64K DRAMS.
- ★ Uses new Intel 8203-1 LSI Memory Controller.
- ★ Requires only 4 Dip Switch Selectable I/O Ports.
- ★ Runs on 8080 or Z80 S100 machines.
- ★ Up to 8 LS-100 boards can be run together for 2 Meg. of On Line Solid State Disk Storage.
- ★ Provisions for Battery back-up.
- ★ Software to mate the LS-100 to your CP/M* 2.2 DOS is supplied.
- ★ The LS-100 provides an increase in speed of up to 7 to 10 times on Disk Intensive Software.
- ★ Compare our price! You could pay up to 3 times as much for similar boards.

BLANK PCB (WITH CP/M* 2.2 PATCHES AND INSTALL PROGRAM ON DISKETTE) $69.95

**$349.00**

#LS-100 (FULL 256K KIT)

## 64K SS-50 STATIC RAM

**$179.00 (48K KIT)**

**NEW!**

LOW POWER!

RAM OR EPROM!

BLANK PC BOARD WITH DOCUMENTATION $52

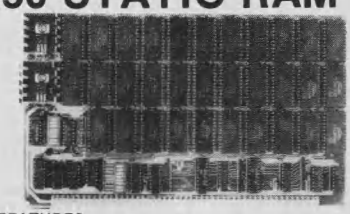
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FULL SOCKET SET $15.00

56K Kit $219

64K Kit $249

ASSEMBLED AND TESTED ADD $50

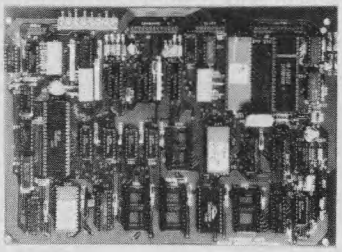


FEATURES:
- ★ Uses new 2K x 8 (TMM 2016 or HM 6116) RAMs.
- ★ Fully supports Extended Addressing.
- ★ 64K draws only approximately 500 MA.
- ★ 200 NS RAMs are standard. (TOSHIBA makes TMM 2016s as fast as 100 NS. FOR YOUR HIGH SPEED APPLICATIONS.)
- ★ Board is configured as 3-16K blocks and 8-2K blocks (within any 64K block) for maximum flexibility.
- ★ 2716 EPROMs may be installed anywhere on Board.
- ★ Top 16K may be disabled in 2K blocks to avoid any I/O conflicts.
- ★ One Board supports both RAM and EPROM.
- ★ RAM supports 2MHZ operation at no extra charge!
- ★ Board may be partially populated in 16K increments.

## THE NEW ZRT-80
## CRT TERMINAL BOARD!

***A LOW COST Z-80 BASED SINGLE BOARD THAT ONLY NEEDS AN ASCII KEYBOARD, POWER SUPPLY, AND VIDEO MONITOR TO MAKE A COMPLETE CRT TERMINAL. USE AS A COMPUTER CONSOLE, OR WITH A MODEM FOR USE WITH ANY OF THE PHONE-LINE COMPUTER SERVICES.***

FEATURES:
- ★ Uses a Z80A and 6845 CRT Controller for powerful video capabilities.
- ★ RS232 at 16 BAUD Rates from 75 to 19,200.
- ★ 24 x 80 standard format (60 Hz).
- ★ Optional formats from 24 x 80 (50 Hz) to 64 lines x 96 characters (60 Hz).
- ★ Higher density formats require up to 3 additional 2K x 8 6116 RAMS.
- ★ Uses N.S. INS 8250 BAUD Rate Gen. and USART combo IC.
- ★ 3 Terminal Emulation Modes which are Dip Switch selectable. These include the LSI-ADM3A, the Heath H-19, and the Beehive.
- ★ Composite or Split Video.
- ★ Any polarity of video or sync.
- ★ Inverse Video Capability.
- ★ Small Size: 6.5 x 9 inches.
- ★ Upper & lower case with descenders.
- ★ 7 x 9 Character Matrix.
- ★ Requires Par. ASCII keyboard.



BLANK PCB WITH 2716 CHAR. ROM, 2732 MON. ROM $59.95

SOURCE DISKETTE - ADD $10

SET OF 2 CRYSTALS - ADD $7.50

WITH 8 IN. SOURCE DISK! (CP/M COMPATIBLE)

**$129.95** # ZRT-80

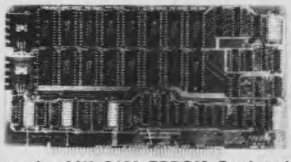
(COMPLETE KIT, 2K VIDEO RAM)

## 32K S100 EPROM/STATIC RAM

**NEW!** FOUR FUNCTION BOARD! **NEW!**

EPROM II FULL EPROM KIT $80.00

A&T EPROM ADD $35.00



BLANK PC BOARD WITH DATA $39.95

SUPPORT IC'S PLUS CAPS $23.00

FULL SOCKET SET $18

We took our very popular 32K S100 EPROM Card and added additional logic to create a more versatile EPROM/RAM Board.

FEATURES:
- ★ This one board can be used in any one of four ways:
  - A. As a 32K 2716 EPROM Board
  - B. As a 32K 2732 EPROM Board (Using Every Other Socket)
  - C. As a mixed 32K 2716 EPROM/2K x 8 RAM Board
  - D. As a 32K Static RAM Board
- ★ Uses New 2K x 8 (TMM2016 or HM6116) RAM's
- ★ Fully Supports IEEE 696 Buss Standard (As Proposed)
- ★ Supports 24 Bit Extended Adressing
- ★ 200 NS (FAST!) RAM'S are standard on the RAM Kit
- ★ Supports both Cromemco and North Star Bank Select
- ★ Supports Phantom
- ★ On Board wait State Generator
- ★ Every 2K Block may be disabled
- ★ Addressed as two separate 16K Blocks on any 64K Boundary
- ★ Perfect for MP/M* Systems
- ★ RAM Kit is very low power (300 MA typical)

**32K STATIC RAM KIT — $129.95**

For RAM Kit A&T - Add $40

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WE ARE NOT ASSOCIATED WITH DIGITAL RESEARCH INC. (CALIF.) THE SUPPLIERS OF CPM SOFTWARE

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OEM - INDUSTRIAL - BUSINESS - SCIENTIFIC

# SINGLE BOARD COMPUTER KIT!

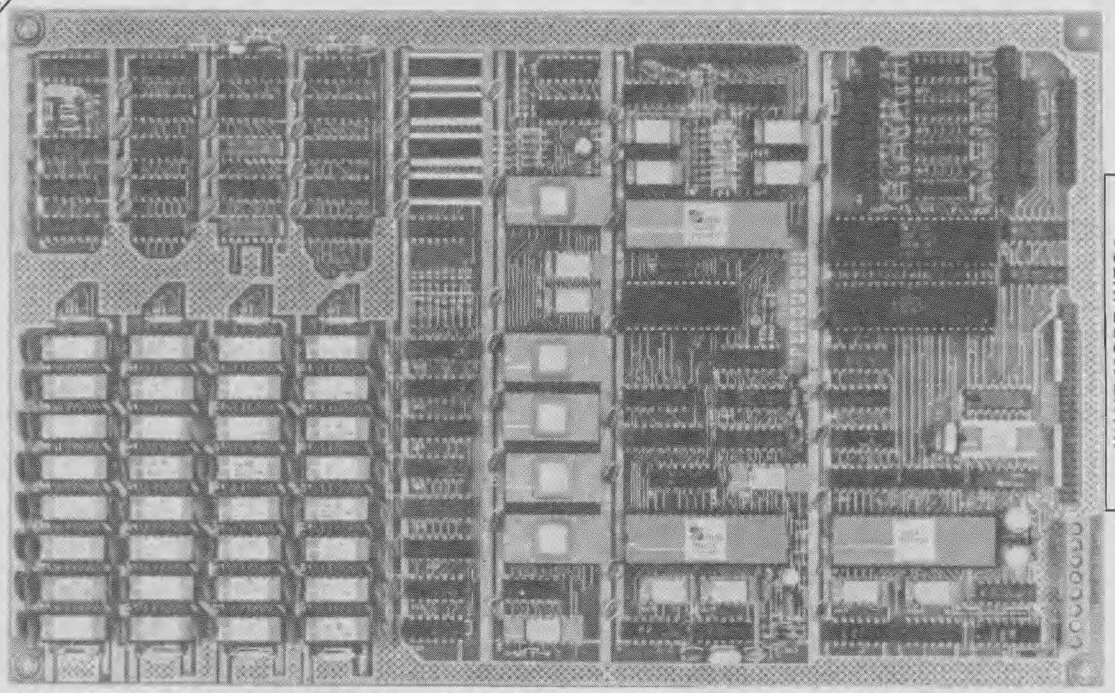
## Z-80 CPU! 64K RAM!

(DO NOT CONFUSE WITH ANY OF OUR FLATTERING IMITATORS!)

NEW LOWER PRICES

NEW!

PARTIALLY ASSEMBLED KITS For All Sockets Installed And Soldered Add $50. (Not For Blank PCB)



WANT MORE INFO? Full Documentation and Schematics — $5.

THE BIG BOARD PROJECT: With thousands sold worldwide and over two years of field experience, the Big Board may just be one of the most reliable single board computers available today. This is the same design that was licensed by Xerox Corp. as the basis for their 820 computer.

The Big Board gives you the right mix of most needed computing features all on one board. The Big Board was designed from scratch to run the latest version of CP/M*. Just imagine all the off-the-shelf software that can be run on the Big Board without any modifications needed.

**$259.00** ** (64K KIT BASIC I/O)

SIZE: 8½ x 13¾ IN.
SAME AS AN 8 IN. DRIVE.
REQUIRES: +5V @ 3 AMPS
+ - 12V @ .5 AMPS.

FULLY SOCKETED!

## FEATURES: (Remember, all this on one board!)

### 64K RAM

Uses Industry standard 4116 RAM's. All 64K is available to the user, our VIDEO and EPROM sections do not make holes in system RAM. Also, very special care was taken in the RAM array PC layout to eliminate potential noise and glitches.

### Z-80 CPU

Running at 2.5 MHZ. Handles all 4116 RAM refresh and supports Mode 2 INTERUPTS. Fully buffered and runs 8080 software.

### SERIAL I/O (OPTIONAL)

Full 2 channels using the Z80 SIO and the SMC 8116 Baud Rate Generator. FULL RS232! For synchronous or asynchronous communication. In synchronous mode, the clocks can be transmitted or received by a modem. Both channels can be set up for either data-communication or data-terminals. Supports mode 2 Int. Price for all parts and connectors: $39.95

### BASIC I/O

Consists of separate parallel port (Z80 PIO) for use with an ASCII encoded keyboard for input. Output would be on the 80 x 24 Video Display.

### BLANK PC BOARD — $99.95

**The blank Big Board PC Board comes complete with full documentation (including schematics), the character ROM, the PFM 3.3 MONITOR ROM, and a diskette with the source of our BIOS, BOOT, and PFM 3.3 MONITOR.**

### 24 x 80 CHARACTER VIDEO

With a crisp, flicker-free display that looks extremely sharp even on small monitors. Hardware scroll and full cursor control. Composite video or split video and sync. Character set is supplied on a 2716 style ROM, making customized fonts easy. Sync pulses can be any desired length or polarity. Video may be inverted or true. 5 x 7 Matrix - Upper & Lower Case.

### FLOPPY DISC CONTROLLER

Uses WD1771 controller chip with a TTL Data Separator for enhanced reliability. IBM 3740 compatible. Supports up to four 8 inch disc drives. Directly compatible with standard Shugart drives such as the SA800 or SA801. Drives can be configured for remote AC off-on. Runs CP/M* 2.2.

### TWO PORT PARALLEL I/O (OPTIONAL)

Uses Z-80 PIO. Full 16 bits, fully buffered, bi-directional. Uses selectable hand shake polarity. Set of all parts and connectors for parallel I/O: $19.95

### REAL TIME CLOCK (OPTIONAL)

Uses Z-80 CTC. Can be configured as a Counter on Real Time Clock. Set of all parts: $9.95

### CP/M* 2.2 FOR BIG BOARD

The popular CP/M* D.O.S. to run on Big Board is available for $139.00.

### DOUBLE DENSITY ADAPTER BOARD -- $149.95 (A&T)

Requires no cuts or MODS to an existing Big Board. Gives up to 670K storage on a single sided 8 in. diskette. With software to patch your CP/M* 2.2.

### PFM 3.3 2K SYSTEM MONITOR

The real power of the Big Board lies in its PFM 3.3 on board monitor. PFM commands include: Dump Memory, Boot CP/M*, Copy, Examine, Fill Memory, Test Memory, Go To, Read and Write I/O Ports, Disc Read (Drive, Track, Sector), and Search PFM occupies one of the four 2716 EPROM locations provided. Z-80 is a Trademark of Zilog.

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**TERMS:** Shipments will be made approximately 3 to 6 weeks after we receive your order. VISA, MC, cash accepted. We will accept COD's (for the Big Board only) with a $75 deposit. Balance UPS COD. Add $4.00 shipping.

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ALL SALES MADE SUBJECT TO THE TERMS OF OUR 90 DAY LIMITED WARRANTY. FREE COPY ON REQUEST.

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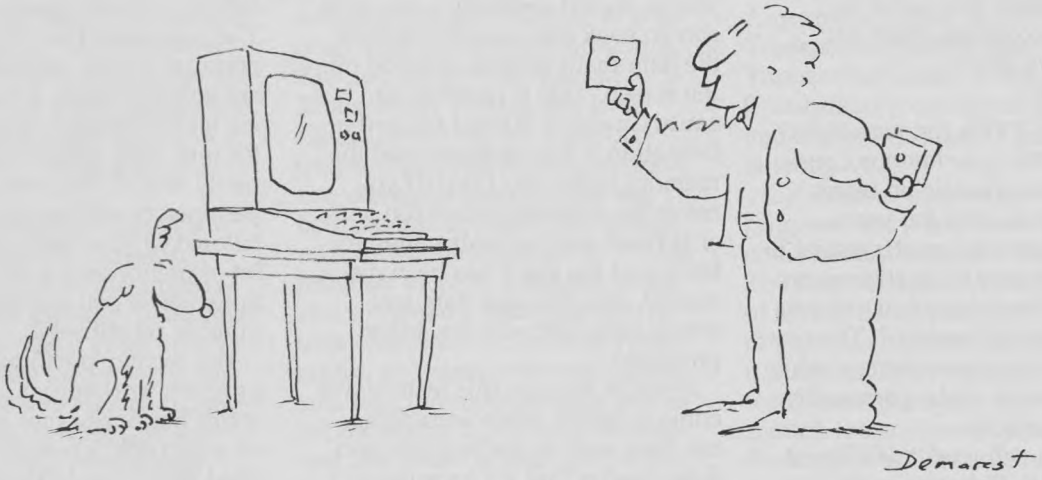

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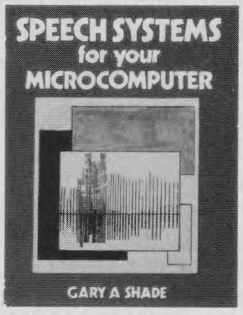
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# Crosstalk XVI: State-of-the-Art Communications

**System Requirements:** 96KB RAM; one disk drive.
**Manufacturer:** Microstuf Inc., 1845 The Exchange, Suite 140, Atlanta, GA 30339.
**Price:** $195.

Crosstalk XVI is the new 16-bit version of the now famous Crosstalk program used on so many CP/M systems over the years. Crosstalk has been controversial in the past because of its strange modem requirements and its proprietary file transfer protocol. The new version makes some changes while retaining much of the personality of the old program.

Crosstalk will work with Hayes, Ovation, U.S. Robotics and other modems. The manual gives good instructions on switch settings for these modems. The manual also does a good job with the rest of the program, but read it carefully. There is a lot of information in the manual—not paying strict attention to instructions will leave you with unexpected results on a regular basis.

The switch settings on my Hayes are a nuisance because nothing else I own uses the same settings. This means if I want to run some other program using the modem, I have to open it back up and change the switches. I've gotten to the point where I don't even bother to put the face plate back on anymore.

While Crosstalk is a command-driven program, it is actually not entirely command driven. Help files are available to assist if you have a question, and a status screen with a listing of the program settings is available at a press of the home key. The help files and the status screen go a long way toward helping you find your way around the program.

### Catch That Data

Some of Crosstalk's more unusual features include a retroactive data capture feature that allows you to change your mind after you've started receiving a file—you can go back and actually capture the data that's already scrolled off the screen. This is possible because Crosstalk doesn't discard information it has received until the memory buffer has filled. If you catch the program before the buffer is filled and the information at the top of the stack has been discarded, you can save data you would have lost with any other program.

If you're like me, this feature will come in handy when something has been sent to you and you suddenly realize that it's important, you haven't made any notes and the line you really wanted to save has just disappeared into the top of the monitor

Crosstalk does an admirable job of supporting a color monitor. You can set foreground and background colors and vary the display colors based on the intensity of the video signal used by the program.

The status line on Crosstalk uses color in another way. When you turn data capture on, the status line turns green to show capture is enabled. When 50 percent of the capture memory is filled, the status line turns yellow to warn you to either save to disk or plan to lose data. When there is 1KB left, the status line turns red and the alarm goes off to let you know that you just ran out of memory. On a 128KB machine you can capture around 66KB before you run out of room.

Crosstalk keeps track of your log-on time for you on the screen so you can see how much your connect bill is going to be. If you don't want to know, you can disable the clock.

### Two Keys

There are two keys to using this program and making it work for you. The first secret is using the command file to configure Crosstalk for a particular application. The command file will set the program up for the application you are going to begin, including defining all the function keys for you. Bit rate, port, telephone number, parity and all the communications parameters will be automatically tailored to your needs. This saves a lot of preliminary work in situations where you call the same number repetitively.

The second key to making this program work for you is the script file. Script files are created on a text editor (which isn't supplied with Crosstalk) and can be used to completely automate the functions of Crosstalk XVI. Script files permit complete programming of the Crosstalk program. All log-on, data entry and log-off operations can be made automatic.

Crosstalk command files will automatically look for a script file with the same name as the command file. If found, the command file will pass control to the script file after the command file has been executed. Commands available in script files include the logical operators If and Not. As a result, a script file can test communications activity and then make decisions about the next action based upon that test.

Using the appropriate command and script files, you can tell your computer to dial The Source or CompuServe, log in to the appropriate database or mail function, send and receive mail, sign off and hang up—all completely unattended. Crosstalk supports data transfer rates up to 9600 bps so speed isn't a problem.

### Porsche?

Crosstalk allows you to exit the program while in the middle of a communications session, run another program and then return to

the communications session with everything still intact. Crosstalk also allows you to emulate several popular terminals, including the DEC VT-100, the IBM 3101, the Televideo 910/920 series terminals and the ADDS Viewpoint terminal.

Crosstalk permits you to run your computer from a remote terminal. You can leave your computer on and call up your computer system while you're out on the job and have it answer the phone. You can then transfer data back and forth from your PC to your remote terminal.

Advertisements for Crosstalk show a Porsche 935 careening around a race track. The implication is that this program is fast and that it handles like a Porsche once you begin to use the power it has. This turns out to be the truth, and you'll find that moving through Crosstalk can be a rewardingly quick experience once you become accustomed to the commands.

For all but the most computer-phobic novices, I recommend a command-driven program for communications simply because after a short time, menus in a menu-driven program become tediously slow. Command-driven programs don't have this problem. Crosstalk is especially well-designed; it provides you with a basic prompt system that complements the commands. When you've forgotten a command, a simple press of the help key will bring a menu of the commands available for the mode you're in.

### Family Ties

Crosstalk is designed to work with the Microstuf family of computer communications programs. Another member of that family is Transporter. Transporter is designed to be used by a person transmitting information between two computer systems that are both essentially under his control.

One obvious application for this program involves a branch office and a company headquarters. If both offices have copies of Transporter, or Transporter and Crosstalk, the computer systems can be left on, and at 2 or 3 a.m. one system can wake up and call the receiving system and transfer information. The calling station can also instruct the other to send whatever data files it has waiting to be sent to the caller. All of this activity can take place in an unattended mode. In the morning, the operators can come in and find a log of the communications activity for the previous night.

Transporter works with Crosstalk in the sense that Crosstalk can be placed in an autoanswer mode. The only thing Crosstalk can't do is wake up in the middle of the night and initiate a telephone call sequence. Transporter will also redial a number if it's busy and continue to try to get through. Unlike Crosstalk, Transporter is a completely menu-driven program. Any novice can sit down and get Transporter running first try. Transporter is now being sold with Crosstalk as a combined package and the two do make a good combination.

Crosstalk is a command-driven program, but it has been tamed considerably from its CP/M days. The help screens will get you out of almost every jam. Don't expect to pick this program up and have it mastered in 15 minutes—you just won't have done any more than scratch the surface of what it can do, but you will be able to use it in that amount of time.

If you want a program which has almost no limitations, Crosstalk XVI should be very high up on your list of possible purchases. I recommend both Crosstalk XVI and Transporter as state-of-the-art communications software for the IBM PC.

**Shawn Bryan**
**Montpelier, VT**

# The Intelligent MicroTerm

**System Requirements:** IBM PC, Zenith Z-100 with ZDOS, TRS-80 Models I, III and 4.
**Manufacturer:** Micro-Systems Software Inc., 4301-18 Oak Circle, Boca Raton, FL 33431.
**Price:** $79.95.

If you own a personal computer, you already know that it's useful for hundreds of business and home applications and that you can literally spend days just experimenting with some of these uses. One fascinating use for personal computers is data communications: sending and receiving data over telephone lines.

Using the popular computer services, like CompuServe or The Source, you can access information on all subjects, read an electronic newspaper or magazine, retrieve information on current stock prices, program in a number of computer languages or send and receive electronic mail, to mention but a few capabilities.

There are several good intelligent terminal software packages to use with your modem. One of these packages stands out for its user friendliness and ease of use: MicroTerm (also known as MTerm), from Micro-Systems Software Inc., is a reasonably priced package available for several computers, including the IBM PC, the Zenith Z-100 and the TRS-80 Models I, III and 4.

### Preliminaries

Once you have followed the DOS loading procedures for your particular computer system, place the MTerm program disk into your disk drive and type MTERM.

You're immediately placed into the terminal mode when you boot the program. This allows you to get right into any of those computer services without worrying about setting up the terminal's communication parameters.

The default settings on program entry are a bit rate of 300, the word length of seven bits, one stop bit and even parity. Defaults are displayed, along with some other important information, at the bottom section of the menu, called the status display. This is a common setup for services like CompuServe and The Source.

Since most inexpensive modems allow only a 300 bits per second (bps) communication rate, and most services are at 300 bps (although at added cost and a different telephone number, you may access them at 1200 bps) the beginner is already set up and ready to go.

If you hardly ever communicate at 300 bps, you can either save those 1200 bps settings to the default file for loading the new settings in on program startup, or save them to another file for loading in from the MTerm command menu.

### The Command Menu

Starting and running the terminal program is simple. Now I'd like to describe some of the easy-to-use features of MTerm. In order to access the command menu from the terminal mode, simply press the delete key on the IBM PC (or press the clear key on the TRS-80)—a command menu will immediately be displayed. Using a single-key entry, you may access all the features of MTerm or go back into the terminal mode.

By entering a single letter, you can easily load a file into the buffer and see exactly how many bytes of memory the file takes up. You can change the RS-232C parameters for a slower or faster communications rate with different word lengths and different parity and number of stop bits, depending on which characteristics your computer requires.

You can also have MTerm dial the phone for you. That's if you have a modem that will dial the phone, exit to DOS and then reenter MTerm by typing MTERM again. All that's required is a single-letter key entry. A nice feature about the command menu is that you don't have to remember which command does what. All you need to do is look over the menu for the command that you'd like to perform.

For example: Say that you just finished downloading a file sent by a friend when you were in the terminal mode. To access the save-buffer-to-file feature, first press the delete key for IBM PC (or the clear key for TRS-80 machines) to display the command menu, and then press the letter S to save the buffer. You'll then be requested to enter a filename to save the buffer to your disk.

Conversely, if you want to send one of your files back to your friend, press the letter L to access the load-buffer-from-file mode. Then enter in the filename of the file you wish to load from disk. After it's through loading, you may transmit the file, now in the buffer, to your friend at the other end of the phone line by pressing the letter T to access that mode. After following the displayed instructions, or just pressing enter three times for the default settings, your file is ready to transmit. To start the uploading, press the delete or clear key to enter the terminal mode and begin the process.

### Some of the Features

Aside from its simplicity of use, MicroTerm has some fine features not common to most terminal programs, including spooled printer output, macro key functions, the opportunity to return to command menu from the terminal mode to execute commands while still receiving data through the RS-232C interface, and finally, transmission and reception of ASCII or binary files.

MicroTerm is the only terminal program I've used that allows access to all its features from a single main command menu. This is where MicroTerm shines, because every function you would want to perform with a terminal program is available on one single menu. There's no forgetting which commands do what. That information is available to you at all times.

The spooling feature of MTerm allows your printer to print the contents of the buffer, while you are still using MTerm for communications with the computer service or other remote stations.

The macro key function gives you ten user-defined keys that may be assigned from one to 64 characters each. The contents of these macro keys can be transmitted manually (by pressing one of the preassigned function keys) or by activation from the remote station with a receipt of an ASCII 05 (ENQ) signal. One possible application for the macro key is to use it to transmit an automatic log-on message.

### XFER Utility Programs

This program is separate from the MTerm program. It allows you to transfer files directly between two computer stations by way of MTerm, without the necessity of first converting them to hexadecimal format. But to use this program, both systems must have a program compatible to XFER. If you are transferring files between two computers that are using MTerm or if you have a compatible XFER-type utility, then the XFER program will come in handy.

One advantage to using this utility is that you don't have to worry about converting your files into ASCII for transmission. Also, the XFER utility allows direct binary file transfer between two computers equipped with XFER.

### The Test

Of course, a review on a product like MTerm wouldn't be complete without a test. I've been using MTerm for several months now to transfer text files and Basic program files from a TRS-80 Model III to an IBM PC, by direct con-

nection through their RS-232C ports. I've also been transferring text files from Radio Shack's Scripsit word processor to the IBM PC to use on Sorcim's SuperWriter word processor—I've had nothing but excellent results.

Since I use MTerm on both machines, I only had to learn how to use one terminal program to transfer the files. Also, because I connect these machines directly to each other for the transfer, I have experimented with several different bit rates with good results. I've also used it to connect to CompuServe at 300 bps, with nothing but good results.

All in all, MTerm is an excellent intelligent terminal package. It's easy to use, and I recommend it to beginners and advanced users alike.

**Howard Berenbon**
**West Bloomfield, MI**

# Businesspak + —All Your 100 Will Ever Need

**System Requirements:** Radio Shack Model 100.
**Manufacturer;** Portable Computer Support Group, 11035 Harry Hines Blvd., #207, Dallas, TX 75229.
**Price:** $89.95.

Last year, the introduction of the TRS-80 Model 100 put truly portable computing power into the hands of users who needed a battery-powered machine to fit in a briefcase. In one Sears-catalogue-sized package, Radio Shack incorporated powerful Microsoft Basic, a text editor, an address book program, a scheduler program and a terminal program into ROM.

Those built-in applications plus the Businesspak+ programs from Portable Computer Support Group may be the only tools you need for the Model 100. The Businesspak+ package contains six cassette tape programs: a word processor that greatly extends the utility of the on-board text editor; a budget report sheet that's actually a mini-spreadsheet; a graph to chart the budget report; a form formatter that uses the built-in address file; a sort routine that sorts any data; and a Telex emulator that accesses the U.S. Postal Service's ECOM electronic mail.

Each program comes on a separate cassette. In some cases, such as with the form formatter, the cassette also contains templates for address file, notebook or inventory input. These formats are the most popular and allow you to load the programs and run them without configuring a form from scratch.

Of course, the only problem with the Model 100 is limited memory. Any one of these programs operates with only modest demands on precious RAM. However, more than one tool loaded at a time will certainly cause problems with insufficient RAM space for data. Many suggestions for minimizing this problem are in the preface of the manual. They include various ways to manage your cassette usage, such as recording a copy of each program on a single long-play cassette. One method (which I thought of but didn't have an opportunity to test) is to load the desired programs into the Model 100 and dump the programs into an account file on The Source or CompuServe. Then you'd erase all but the one you wanted from the Model 100. If you're away from your cassette machine, you could connect to a telephone line and download any particular program back into the Model 100. This method would be good insurance for distant travel where, for example, you'd use the word processing programs. On occasion I've had a module crash and haven't been able to reload until returning to the office.

### Write+

The cornerstone to the whole Businesspak+ set, Write+ transforms the Model 100 text editor into a word processor that incorporates many popular word processing features. Three separate programs comprise the word processor. CORTNS.CO is a small (192 byte) machine language program that loads into the Model 100 before any of the other programs. Once loaded and run, it remains in the Model 100 as a utility for most of the other applications in the Businesspak+ package. W+SPEC .DO is a special text file that allows a user to change specifications and parameters before printing a document. It works with Write+, the actual Basic word processing tool. When loaded, W+SPEC defaults to the most common settings for an 8½ × 11 sheet of paper. In addition to margins and spacing, W+SPEC allows headers and footers to be set. The programs print whatever copy is desired as well as a calculated page number, date and/or time. However, when you enter specs that contradict other specs, you'll get an error message that doesn't indicate which of the 20 or so parameters are miscalculated. For example, the program defaults to 66 lines per page (correct for an 8½ × 11 sheet) with three lines at the top margin and three lines for the bottom margin. However, the default for printing lines per page is 62. This spec adds header and/or footer copy to the body copy for its default. Considering that headers/footers can be abled or disabled by separate commands, this can cause some confusion. The manual is a little ambiguous about these calculations.

The W+SPEC specifications act on the entire document. To alter margins, spacings, justifications and some other formats, Write+ employs dot commands, like WordStar's. These commands can change double-spaced, full width margins to single-spaced indented paragraphs. Another dot command, .Mn, starts a new page unless n more lines fit on the current page. The command functions are comprehensive and easy to learn—important for many Model 100 users!

Write+ supports almost any printer either parallel or serial. As

defaulted, the program works perfectly with an electronic typewriter with a parallel interface (a Brother Correctronic-50). The manual explains using Write+ with a Radio Shack 100 dot-matrix printer or a Smith-Corona TP-1. The program's ability to execute hidden control characters allows the Model 100 to activate extended functions on most printers. The specification menu also allows you to invoke a global setup string before a document begins printing. Changing the printer output spec from LPT: to COM: directs printing to the 100's serial port that can be connected to a printer or other RS-232C input device.

Formatted output from the Model 100 is impressive and, except for the minor problems stated above, easy to master. This program is worth the price of the entire package.

**Expns+—Mini Spreadsheet**

Within the Businesspak+ package is a budgeting program that behaves like an electronic spreadsheet. EXPNS+ lets you set up an 18×18 matrix for simple record-keeping or budgeting. A suggested use for EXPNS+ (a template, E+trav, is included) is to maintain travel records. Common expenses are listed in rows and days of the week are listed as column headings. This template gives a good practical example of how EXPNS+ can be used. Another template on the tape is for creating a budget sheet. E+ is a text file that allows you to change parameters for your report as well as set up new headings for different sheets. Once set up in E+, titles and the like aren't subject to accidental change while in the EXPNS+ program.

In addition to numeric entries, the program allows input of titles, headers, footers and any other notes. The row and column labels appear along the bottom of the screen. Data is then input and added to vertical and horizontal totals, also shown along the screen bottom. The function keys each become soft keys. Function key 1 clears the sheet, F2 finds a percent, F3 replicates and so on.

Businesspak+ is almost everything a software package should be.

Press F7 and your report is printed in familiar spreadsheet fashion with complete rows and columns. Printer column width is changeable. A small carriage printer prints as much as possible across the page before automatically starting a second page to finish the report.

EXPNS+ is a powerful little tool for the Model 100. It has functions that some of the larger electronic sheets don't have. However, once again, power has its price. In a larger machine, you'd marvel at how much capability is packed within about 7500 bytes of programming code, but the Model 100 must almost be dedicated to this application alone.

**Graph+**

Graph+ is an amazing program that takes data entered in EXPNS+ and plots it as a pie, bar or line graph. This program even centers your EXPNS+ title before proceeding with graphing. It takes column and row designations from the E+ file and automatically labels the axis of a graph. The version of Graph+ I had for review supported six Radio Shack printers: DMP 100, DMP 120, DMP 200, DMP 400 and DMP 500. The program even supports Radio Shack's color graphics plotter, the CGP 115. Because I don't have any of the RS-supported printers, I was unable to see the printing in action. I did, however, run the program through as far as I could before printing. I can attest to this tool's ease of use. Perhaps a future release of Graph+ will include optional printer drivers that can be loaded as necessary, one at a time.

**Put+ and Sort+**

Put+ is a tool that enables you to file information in a preformatted way. Put+ and Sort+ allow the Model 100 to sort information on any of the 16 fields allowed by Put+. A template labeled P+ ADRS fills the screen with an index card-like form that includes the usual information, such as name, address and so on. A field called Code allows you to insert any type of field selection information. All public relations firms can be coded PR for easy searching later on. All information is prompted, and once the card is filled in properly, you press F3 to save the information to RAM.

Two other useful templates are included with Put+. They are P+Note, which puts information into the 100's NOTE.DO file, and P+ Inventory. As in the other programs, it's simple and fast to create and save your own screen format.

The Sort+ module is straightforward. It's a fast routine that sorts listings of up to 255 names and addresses in about 20 seconds. I didn't load in that many names but I can attest that it's fast, especially considering the Model 100's slow clock rate.

Sort+ has just a few limitations. For example, it sorts numbers only if they take up the same number of spaces. Thus, 4, 25, 100 and 1000 would have to be entered as 0004, 0025, 0100 and 1000. You should arrange your fields to sort on other than variable length numerics. Names and phone numbers are good field types for Sort+. More than any other program in this package, Sort+ requires every available byte of RAM to perform. The manual stipulates at least 4KB and more with a data file of any length.

**Telex+**

This application should be renamed so potential users will know that it also logs-on to send ECOM mail. Telex + sends any text file to any Telex machine or ECOM to any mail address. The manual promises that new Telex + users will receive a certificate for a free Telex trial of three messages, but because I had a review copy of Businesspak+, I didn't receive the certificate.

The sign-on procedure for Telex+ is similar to the Model 100's Telcom. Telex+ is selected

from the main menu. In a few seconds the program queries for a text filename to send. It then asks if it will be sent to an ECOM or Telex number. When you type in a Telex machine number, it calls Telex, signs on and sends your text message complete with all codes, headings and sign off. If your printer is connected, it outputs your message so that you have an instant copy. If your printer isn't connected, the message scrolls across your screen. The program confirms that the message is sent and logs off—all automatically. The Telex+ section of the manual illustrates many formats for ECOM outside the United States and multiple addresses. The Telex+ section of the manual concludes by inviting a troubled user to call PCSG.

**Documentation**

The Businesspak+ manual is as simple and logical to use as the six application programs. It's loose-leaf bound with 128 pages. Following a brief and information-packed introduction are six sections separated by easy-to-find laminated tabs. Each program description has its own section. You learn how to load each module and run the program, with ample examples for using the program as well as tips on how to get the most from it. Each section ends with a summary of the chapter. The Write+ chapter also includes a table of contents and fully cross-referenced index. My only suggestion is simply that PCGS consider shrinking the format of the binder to a smaller size to be carried with the Model 100 for reference. As it is, it takes up almost as much room as the computer itself.

**Summary**

Businesspak+ is almost everything a software package should be. Aside from my constant worry about working memory, the programs all worked as promised. Write+ resides in my Model 100 all the time. Programs written while traveling can be printed at home on an electric typewriter or at the office on a dot-matrix printer. Tandy has now introduced a disk drive for the Model 100. If these programs were on these drives for quick access, they'd be used even more often.

Each program takes full advantage of the Model 100's innate features, such as text editing and telcom. The Businesspak+ extends many of the ROM routines to make the Model 100 almost user-transparent.

If you own a Model 100, you'll do yourself a service to purchase Businesspak+.

**Keith Thompson**
**Peterborough, NH**


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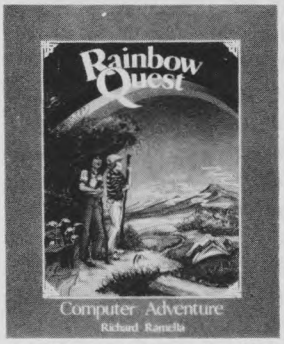
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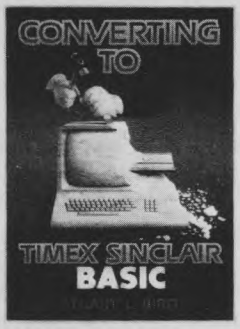
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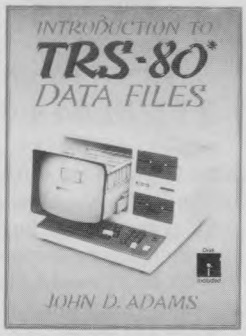
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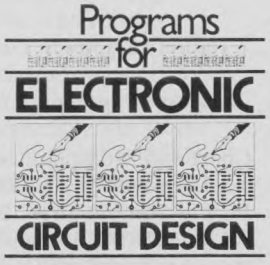
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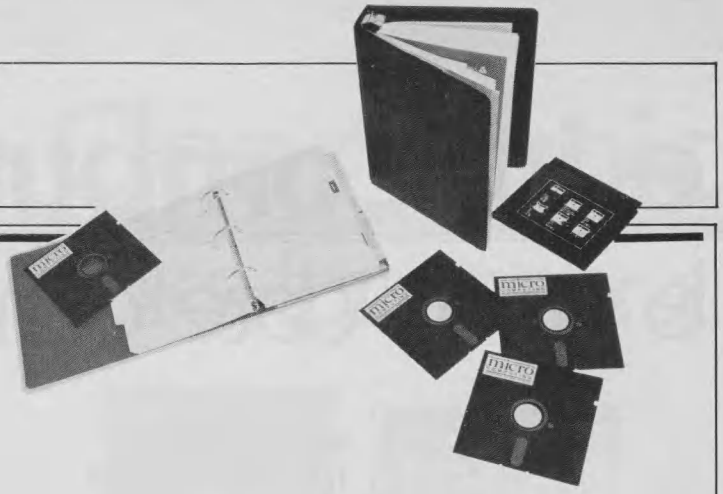
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# NEW SOFTWARE

Edited by Amy Campbell



## Microsoft Project: A Manager's Scheduling Tool

Designed to help the general business manager plan schedules, assign resources and develop cost budgets for large or small projects, Microsoft Project ($250) works much like an electronic spreadsheet. Project features let you monitor schedules, project over time and create individual resource and cost tables, graphic displays of schedules and resource utilization.

Project gives you what Microsoft refers to as instant what-if capabilities, which let you immediately assess the impact of scheduling changes to determine the best schedule. Graphics provide you with a visual schedule to identify priorities and critical activities. You can change activity dependencies and resources at any time.

The Resource Cost Table offers up-to-date information on project costs by providing a summary of the cost-to-complete at any selected date. A display of the Resource Profile Chart shows how each resource is being used and allows you to quickly determine resource-leveling requirements.

Project can produce detailed reports that you can send directly into word processing programs. Project information can also be transferred to Microsoft Chart and Multiplan, Lotus 1-2-3 or dBase II. The IBM PC program requires 128KB RAM (192KB RAM with mouse support) and is marketed by Microsoft Corp., 10700 Northup Way, Bellevue, WA 98004. Reader Service number 426.

## Word III: Samna's Papa Bear

If software packages were fairy tales, then Samna Corp.'s line of word processors would be Goldilocks and the Three Bears. After marketing Samna Word II (or Mama Bear), they've decided to beef up the package and sell Samna Word III, a Papa Bear of a word processor aimed at phasing out the stand-alone word processor systems used in big businesses. And if all goes well, they'll release the baby (Samna Word I) in the near future for the low-end market.

Samna Word III ($650), designed for long and complex tasks, is loaded with features, including glossaries, user-definable function keys, five function math, spell checking and correction, column mode, automatic indexing, section numbering, table of contents generation, direct typing (keyboard to printer), international/special purpose keyboard support and full support for tree-structured file directories and subdirectories under MS DOS 2.0.

Samna Word III also includes standard features of Samna Word II (version 1.1), such as line drawing, mail merge, hyphenation, justification, pagination and other formatting aids. Multilevel help messages give you only as much help as you ask for.

Current users of Samna Word II can upgrade to Word III for $250. It's available for the IBM PC, XT and PC compatibles. Samna Corp. is headquartered at 2700 N.E. Expressway, Suite C-1200, Atlanta, GA 30345. Reader Service number 427.

## Remote Control Adds Features

Remote Control ($180) integrates word processing and communications so that you can prepare and send messages from a single program on your IBM PC. And with a Model 100 or an NEC PC 8201A, the program adds two additional features.

Remote Control comes with its own null modem cable to let you transfer notes at high speed between a portable and IBM PC. Even on the road, you can stay in touch with your office—Remote Control's host mode lets you communicate with and control your IBM PC over telephone lines from your portable's keyboard. You can move files, execute DOS commands, even run stand-alone programs.

The software is modeled after the internal software of the Radio Shack and NEC computers. The command structure is identical so you don't need to learn any new programs.

Remote Control is a product of Kensington Microware Ltd., 251 Park Ave. South, New York, NY 10010. Reader Service number 429.

## Communications Flexibility for Your IBM PC

Copylink-PC ($99.95) lets you make high-speed data transfers between an IBM PC and some 30 dissimilar types of CP/M and MS DOS computers and operating systems. It also gives the PC access to public information services, Telex and TWX networks and lets it emulate communications terminals via 300 and 1200 bits per second (bps) modems.

Commands are simplified to single keystrokes. It can automatically dial from a stored directory, log-on, access a mailbox, log-off and hang up the line all from one command.

Other features include Xmodem protocol, the ability to receive more than one disk of data, user-defined parameters, control of a PC from a remote site, audible error prompt, manual and smart modem support, full- and half-duplex transmission and null modem transfers to 19,200 bps.

Documentation includes a 334-page book, *The Complete Handbook of Personal Computer Communications.* Copylink-PC is a product of U.S. Digital, 5699-D S.E. International Way, Milwaukie, OR 97222. Reader Service number 430.

## pfs:Proof Checks Spelling on IBM PC

pfs:Proof ($95) is a one-step proofreader for the IBM PC that not only flags misspelled words in a document but provides the correct spelling so you don't have to bother with a dictionary. It also checks for irregular capitalization, double words and typographical errors. You make corrections with a single keystroke.

The software contains its own 100,000-word dictionary and a personal dictionary for you to customize to your specific needs. It works with pfs:Write or any other ASCII text file.

pfs:Proof is a product of Software Publishing Corp., 1901 Landings Drive, Mountain View, CA 94043. Reader Service number 428.

## IBM Framed by Ashton-Tate

Ashton-Tate claims its new software lets you manipulate and analyze words, concepts and data as easily as current spreadsheet programs handle numbers alone. Framework ($695) marks a new generation of productivity software for the IBM PC.

Included in the 256KB RAM program are a word processor, a spreadsheet, business graphics, data management capabilities, forms processing and—what sets it apart from other integrated packages—its unique outline generator.

Framework is built around frames, which are similar to windows except that they organize information. Its outline mode lets you quickly capture ideas and concepts and lets you expand a single-line subheading into text, spreadsheet, graphs or any combination of numbers, graphs or text you require.

Framework contains its own procedural language. It works in conjunction with Ashton-Tate's dBase II, Lotus 1-2-3 and other ASCII files. Through its DOS access facility, you can run PC DOS software in Framework. It works with a standard IBM monochrome display.

Ashton-Tate is located at 10150 W. Jefferson Blvd., Culver City, CA 90230. Reader Service number 425.

## Get Smart: An Integrated Software Package

Innovative Software has released a complete set of Smart integrated software for (would you believe?) $895. The integrated business system includes word processing, spreadsheet with graphics and data management. Each functions as a stand-alone program and can be purchased separately.

Special features let you execute sequences of commands to complete an entire project with just one keystroke. The software pulls data directly from the applications programs without manipulating it through an intermediate file. Commands are structured into three confidence levels so you can progress from simple to complex procedures at a comfortable speed.

Included with the whole or partial system are training tapes, software updates, a toll-free user's hotline and quarterly newsletter. For more information, contact Innovative Software, 9300 West 110th St., Suite 380, Overland Park, KS 66210. Reader Service number 431.

## Low-Cost IBM Graphics Tool

Image Builder ($49.95) is a multifunction interactive color graphics program for the IBM PC, XT and Junior and compatibles. It creates, changes and stores graphics images and screens.

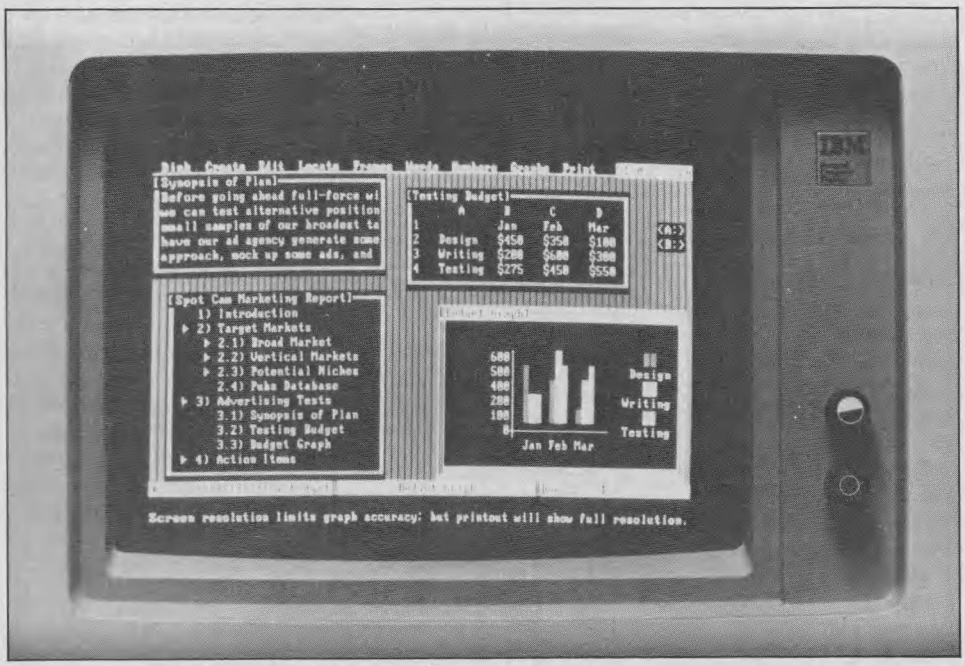
Use Image Builder to produce presentation documents, print reports with embedded pictures and create graphics images and screens for manipulation by other graphics programs.

The program requires 128KB RAM with DOS 1.0, 1.1 or 2.0 and color graphics capability.

For more information, contact The PC People, 806 E. Abram, Suite 308, Arlington, TX 76010. Reader Service number 432.

## Electronic Clip-Art For the IBM

VCN ExecuVision ($395) is a presentation graphics program with add-on libraries of predrawn images that you can incorporate as illustrations or enhancements to basic graphs or text slides. With just a few keystrokes, you can create elements on-screen, then combine, move, alter or color them and store on disk for later use or revision.




*Ashton-Tate's Framework replaces windows with frames that can contain text, spreadsheets, bar graphs and outlines on a standard IBM monochrome display.*

The program includes ten different text fonts with rescaling and color options, choice of foreground and background color, electronic scissors and eraser, manual and automatic runtime options, cataloging capability, hard copy printing variations and speed variations for animation techniques.

Add-on software libraries feature dozens of predrawn images that you can use complete or revise. The first six libraries include borders, initials and decorative designs, industry and business graphics, faces and figures, international symbols and landmarks, and maps and regions from around the world.

VCN ExecuVision runs on a 128KB IBM PC with two disk drives, a color graphics board and color monitor under MS DOS 1.1. It is compatible with both IBM and Epson dot-matrix printers. You can make color slides from the images with a camera that attaches to the screen or one set on a tripod.

For more information, contact Prentice-Hall Inc., Business and Professional Division, 200 Old Tappan Road, Old Tappan, NJ 07675. Reader Service number 433.

## Put 130 Pictures In Your Macintosh

Even if you can't draw to save your life, you can add impressive graphics to your documents with McPic ($49.95), a push-button picture library that gives you 130 pictures in a variety of styles created by professional artists.

You can use the art as is with the click of the mouse, or you can customize it using MacPaint/MacWrite. You can reduce or expand it in size and change patterns and tones.

The 130 McPictures cover a wide range of categories applicable to almost any situation for business, home, school and so on. Use them to create letterheads, illustrate reports, create invitations or pep up newsletters.

McPic is available from Magnum Software, 21115 Devonshire St., Suite 337, Chatsworth, CA 91311. Reader Service number 436.

## TRS-80 Database Management System

List/Key ($250) is a database management system for the TRS-80 Models III, 4 and 4P with simple menu-driven options and over 100 specific help messages. With the ability to span four disk drives, List/Key has more storage capacity than any other TRS-80 system available. Its special feature is a help menu that can be called on at any time for explanations of the options list that appears on the screen.

Two configurations of the program are available. One features a complete List/Key program that's already configured with sample formats and data on a variety of TRS-80 magazines; the other is ready to use with your own information.

List/Key is intended for lists of people. Select from a home-use format, a small-business format or a professional-application format. Each of the 17 to 24 individual entry spaces is adjustable. Each record item can hold up to 376 characters.

The self-updating index can be set for any of 24 entry fields. Other features include comprehensive record selection, printing features for records, labels, envelopes and a telephone directory. Optional features include a form generator with an interface to common TRS-80 word processing programs, a statistical package that validates zip and area codes and also interfaces to common spreadsheet programs and, lastly, a communications package that allows list transfer and automatic phone dialing.

For more information or to order, contact The Softplace, PO Box 7370, 1439 E. Garfield Ave., Glendale, CA 91205. Reader Service number 437.

## Common LISP For the IBM PC

Gold Hill Computers has announced the first common Lisp for the IBM PC. Golden Common Lisp ($495) is an artificial intelligence development and training environment containing an intelligent editor (GMACS), on-line help function, tutorial and the book *LISP*, as well as a reference manual.

Golden Common Lisp brings the software programming environment of artificial intelligence research laboratories into reach of owners of the IBM PC with DOS 2.0 and 256KB RAM. It offers a full range of data types, including closures, coroutines, vectors, multidimensional arrays, named structures, and single and double precision floating-point numbers.

GCLisp detects the presence of the optional Intel 8087 math coprocessor and utilizes it for increased performance in graphics and numerical computation. Operating system extensions include a full-screen intelligent editor, program development system, full DOS support, macros, color graphics support and stream-oriented I/O.

For more information, contact Gold Hill Computers Inc., 163 Harvard St., Cambridge, MA 02139. Reader Service number 440.

## Hard Copy Graphics on a Letter-Quality Printer?

If you have an NEC, Qume, Diablo or other impact printer with a graphics mode of operation, you can create presentation-quality bar graphs and pie charts. The PC DOS or CP/M software packages, Printer Graphics I (bar graphs) and Printer Graphics II (pie charts), sell for $75 each.

For more information, contact Cedar Lakes Software, 9235 East Harry, Wichita, KS 67207. Reader Service number 434.

## Epson Link for IBMs and Apples

A configuration program, Keyprint ($59.95), lets your Apple II, Apple IIe, IBM PC, IBM XT and compatibles control character sets and font type capabilities of the Epson MX, RX and FX dot-matrix printers. It allows the nontechnical user to take advantage of all the capabilities of the printer in combination with the unique features of any and all applications software packages.

Over 20 options are on the menu, including double-strike, compressed, italicized and other enhanced character sets. Keyprint is useful for compressing spreadsheet printouts.

For more information, contact SoftKey Software Products Inc., 2727 Walsh Ave., Santa Clara, CA 95051. Reader Service number 435.

## Japan's Prolog Available for IBM

Prolog, the logic language the Japanese use as the core language for their fifth generation computers, is now

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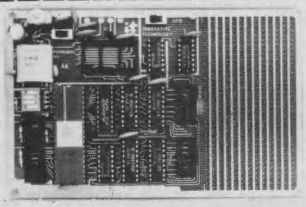
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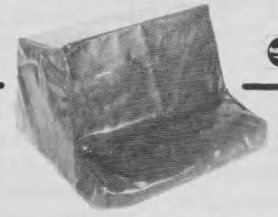
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tailored for use on the IBM PC, Sirius, Apricot and DEC Rainbow as well as eight-bit Z80 microcomputers.

LPA Micro-Prolog is available in a format for 16-bit 8088/86 processors operating under PC DOS/MS DOS or CP/M-86 for $295; the eight-bit Z80 computers running CP/M-80 format cost $195. Licensing fees for additional computers run between $75 and $95.

Micro-Prolog includes development systems for use with either an English-style syntax or the standard Lisp syntax. It has more than 70 primitive relations, including integer point and floating point arithmetic, console I/O, random access disk I/O and formatted record I/O.

Its applications include fields of expert systems, intelligent databases, software prototyping and artificial intelligence programming. For more information, contact Logic Programming Associates Ltd., 10 Burntwood Close, London SW18 3JU, England. Reader Service number 439.

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## 8086/88 Utilities Package

Four programming tools, including a full-screen text editor, a dynamic debugger, an object module linkage editor and a library manager, have been released by Phoenix Software Assoc. for use in 8086/88-based systems running PC DOS, MS DOS and CP/M-86.

P-Mate86 ($225) is a text editor with a macro command language, automatic disk buffering and ten auxiliary buffers that you can edit individually or use as scratch pads for cut-and-paste operations. Horizontal scrolling creates lines up to 250 characters long.

P-Fix86 ($245) is a symbolic debugger for MS DOS featuring windowed full-screen display, an in-line assembler and test evaluation at breakpoints. P-Fix86 can load the map produced by the P-Link86 linkage editor and uses the symbols and line numbers with the program under test. For making and testing instant fixes, the in-line assembler produces code for both the 8086/88 and 8087 chip sets, among other features.

P-Link86 ($395) handles the output of Microsoft's and IBM's 8086 compilers and assemblers as well as those from Lattice, Computer Innovations and others. It lets you specify overlays with no modifications to the application program to reduce memory requirements, and you can combine it into one or more disk files.

P-Lib86, an object library manager included as part of the P-Link86 package, handles libraries built according to the Intel or Microsoft format. It helps you to build libraries from scratch, delete modules from existing libraries, merge libraries and produce cross-referenced lists.

For more information, contact Phoenix Software Associates Ltd., 1420 Providence Highway, Suite 260, Norwood, MA 02062. Reader Service number 469.

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## Professional Basic Accesses IBM Memory

Professional Basic is a new implementation of the Basic language that lets you access the full memory of the IBM PC. You can put a 100KB program in memory that uses a 300×300 matrix, then perform calculations with the ultrafast 8087 math coprocessor.

The package contains a window-oriented system of more than a dozen tracing and debugging screens. You can view changes in variables or array elements, progress of for . . . next loops or gosubs and more. The values of each variable display at every point during execution of the program as it runs at slow speed. Professional Basic has a dynamic syntax checker and lets you label gosubs, cross reference and set breakpoints. The ability to see on the screen precisely how a program works makes it an excellent tool for sophisticated programming and learning purposes.

Professional Basic is written in assembler and requires 256KB RAM. It sells for $345 from Morgan Computing Co. Inc., 10400 N. Central Expressway, Suite 210, Dallas, TX 75231. Reader Service number 441.

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## Let Your Micro Teach You German

If you own an IBM or Apple microcomputer and the only languages you know are Basic and Pascal, you could stand to have your horizons broadened a little. Let your computer teach you a foreign language, such as German, French or Spanish, with the help of the Language Lab training system. It teaches you the skills you'll need to become fluent in a language that lets you talk to people instead of computers—what a concept!

Language Lab offers computer-aided study, self-quizzing and an interactive audio cassette for pronunciation that starts and stops automatically in coordination with the lessons. The program monitors your progress and charts it. With add-on features, you can customize lessons and add advanced learning levels.

The package requires a 64KB RAM computer (IBM PC, PCjr, Apple II, II Plus or IIe) one disk drive and an audio cassette recorder.

Each language is available at $235; add-on levels cost $69 per level. Contact Lamplighter Software Inc., 7 Breton Ave., Melville, NY 11747 for more information. Reader Service number 442.

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## Z80 Program Development System

ZDS is a development program for Z80 CP/M computers with a full-screen editor, macro assembler, linker, library manager, macro library, 8080 to Z80 translator and a dynamic debugger. The editor has automatic file buffering, a powerful command set and built-in customization for the user terminal.

The macro assembler produces Intel HEX or Microsoft REL object files and has built-in cross reference generation for symbols, op codes and macros.

The linker clears program memory to eliminate garbage code in storage blocks. It can locate a specific file on any disk and link large files.

The library manager creates, modifies and updates libraries of object modules in the REL format. The macro library includes Z80 routines. CP/M I/O routines provide basic CP/M BDOS functions with automatic disk error handling.

The debugger includes a HEX/ASCII file display/list program and an ASCII listing program. The ZDS system and manual costs $159.50 plus $1.50 for shipping and handling. It is available from Elliam Associates, 24000 Bessemer St., Woodland Hills, CA 91367. Reader Service number 438.

BOOKS

Wayne Green Books

BOOKS




***Rainbow Quest for the Color Computer***

*A computer fantasy for young Color Computer users.* Rainbow Quest *is an adventure that combines fiction and programs. Readers must cross the planet Rainbow and master a series of challenges to succeed on the Quest. Each challenge is a program on cassette. Included are arcade games, puzzles, and mazes. Book and cassette sold together.* **$24.97 BK7391 128 pp.**



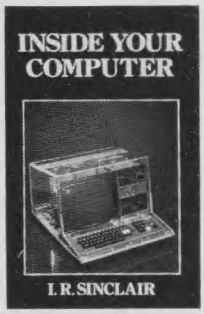

***Converting to Timex/ Sinclair BASIC***

*Convert programs to run on your T/S 1000 or 1500. This is a guide to translating from other BASICs into Sinclair BASIC. Fifteen types of instructions are covered. The T/S replacement is given for each, followed by a description of its use and an example. Much of the material applies to the T/S 2068.* **$14.95 BK7396 206 pp.**




***Introduction to TRS-80 Data Files***

*Learn by doing with this guide to writing a data base manager. This book, with its accompanying software, takes you through a simple, mailing list program to teach you about sequential and then random access files. The construction of a DBM and the techniques for moving data to and from disks are discussed.* **Book and TRS-80 disk** *$24.97 BK7398 approx. 144 pp.*




***Inside Your Computer***

*Find out what goes on inside your machine.* Inside Your Computer *explains microcomputer circuits and how they work. Topics include chips, interpreters, circuits, machine language, binary numbers, algorithms, ASCII code, software, and what they all mean to the computer. Includes many photographs and schematics.* **$12.97 BK7390 108 pp.**



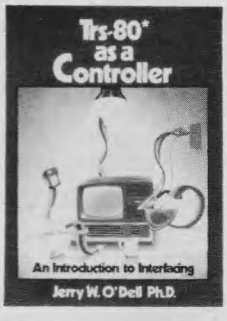

***TEXTEDIT***

*Build your own word processor with the TEXTEDIT kit. This TRS-80 Disk BASIC system is built in modules, so you can modify them or use only the parts you need. Features include complete editing, search, replace, and count, and upper/lowercase typing on an unmodified Model I. Model III users need the TRSDOS CONVERT utility to use the disk. TEXTEDIT is compatible with any major DOS. It operates with one drive; two drives or copy utility needed to transfer programs to system disk.* **Book and disk package $24.97 CC7387**



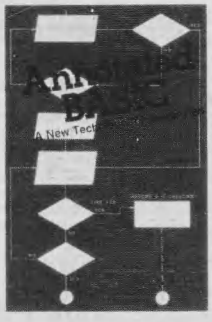

***Computer Carnival***

*For the TRS-80 Models I and III. These sixty programs for beginners will entertain and educate. Children will find mazes, word games, graphics, puzzles, and quizzes. Card games, logic tests, word and number quizzes, and letter guesses make* Computer Carnival *a learning experience. The* Carnival Companion *cassette of all sixty programs is also available.* **Computer Carnival and Carnival Companion** *$24.97 CC7389* **Computer Carnival** *$16.97 BK7389 218 pp.* **Carnival Companion** *$9.97 TP7389*



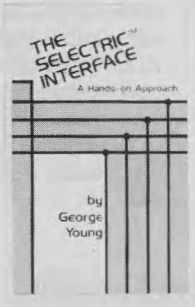

***TRS-80 as a Controller***

*Learn to control outside devices with a TRS-80. This book is an introduction to interfacing, with simple, inexpensive projects. Applications include controlling lights and switches, building a small computer, and suggestions for more complex applications. The book applies to the Model III and, with minor conversions, the Model I.* **$12.97 BK7394 192 pp.**



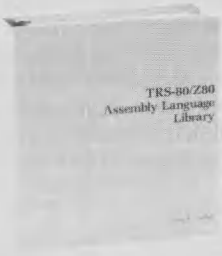
***Annotated BASIC, vols. 1 and 2***

*This two-volume set teaches you the hows and whys of BASIC programming. TRS-80 Level II programs are taken apart and described in detail. Each program is accompanied by documentation, program annotation, BASIC concepts and definitions, and a flowchart.*
**Vol. 1** *$10.95 BK7384 160 pp.*
**Vol. 2** *$10.95 BK7385 125 pp.*




***The Selectric™ Interface***

*You can turn an IBM Selectric I/O writer into a letter-quality printer for your computer.* The Selectric Interface *gives you the programs and step-by-step instructions you need for Selectric models 2740, 2980, and Dura 1041. With slight modifications, the instructions will work for various chips.* **$12.97 BK7388 124 pp.**




***TRS-80/Z80 Assembly Language Library***

*Learn to use assembly language on the Model I to its full capacity. Two TRSDOS-compatible disks are included, with programs worth many times the book's cost. You'll learn about TRS-80 hardware and software, general Z80 routines, and TRS-80 utility programs. Examples show you how to apply the information to your everyday programming. Model III conversions are given.* **$34.97 BK7395 355 pp. Disks included.**

***40 Computer Games from Kilobaud Microcomputing***

*Accept the challenge of some of the best games* Kilobaud *has published. This collection has everything from racing games and gambling to space adventures and calculator games for a variety of systems. Conversion instructions are given.* **$7.95 BK7381 148 pp.**

***Some of the Best from Kilobaud Microcomputing***

*Get the programs for your PET or TRS-80 that readers chose as their favorites. Chapters include detailed programming techniques, reviews, building and interfacing, peripherals, and file structures. Applications include word processors, data base managers, and text formatters.* **$10.95 BK7311 223 pp.**

***Kilobaud Klassroom***

*Learn electronics with this hands-on course. This collection of electronics projects starts with simple concepts and takes you on to building your own small computer. You'll learn electronics theory and get the practice you need to master digital electronics.* **$14.95 BK7386 393 pp.**

*For credit card orders, call* **toll-free, 1-800-258-5473**. Or send your order on a separate piece of paper to: **Wayne Green Books, Retail Sales, Peterborough, NH 03458**. Be sure to include the book title, order number, and price. Postage and handling is $1.50 for the first book, $1.00 for each additional book. Foreign air mail is $10.00 per book. Check, money order, or complete credit card information must accompany order. If you have questions about your order, write customer service at the above address. Please allow 4-6 weeks for delivery. WGBooks available at your local bookstore. Dealer inquiries invited. Orders are payable in US dollars only.

Circle 367 on Reader Service card.

# NEW PRODUCTS

## Sord Desktop Boasts Real Power

The Sord M68 desktop computer is a real heavyweight. Using 256KB RAM chips, the M68 has a dual processor featuring both a 16/32-bit MC68000 CPU running at 10 MHz and an eight-bit Z80A CPU. In addition, an AMD 9511 math coprocessor speeds up arithmetic processing.

The machine runs CP/M-68K, UCSD Pascal, RDOS, KDOS and the CP/M-80 operating systems, as well as languages C, Pascal, Fortran, Cobol, APL and Basic.

The standard unit comes with 1MB memory ($5490). Plug-in boards of 1MB each ($2295) can be added for a total of 4MB. All M68 systems include the main system unit and keyboard, two 1.2MB 5¼-inch floppy disk drives, a green phosphor monitor, PIPS (Sord's no programming language/integrated software package) and Basic II. An M68 with 256KB memory is available starting at $4490.

The unit is available through Sord Computer of America Inc., 645 Fifth Ave., New York, NY 10022. Reader Service number 403.

## Zenith: Three Enhancements

Three board enhancements have been released for the Zenith desktop computers by Piiceon (2114 Ringewood Ave., San Jose, CA 95131).

They are a 256KB memory board ($750) for the Zenith Z-100 personal computer and two hard disk drives.

The ZD 100-10 ($1795) is a 10MB Winchester disk drive, and the ZD 100-20 ($2285) is a 20MB version. Both external disks and the memory board come complete with software that's compatible with all levels of ZDOS, as well as necessary cabling and connectors. The products are available at Zenith and Heathkit dealers. Reader Service number 412.



*A dual processor and 256KB RAM chips make the Sord desktop a powerful and flexible contender.*




*The Corona PPCXT portable with hard disk, 256KB RAM and high-resolution screen comes bundled with software for $4895.*

## Corona Releases Hard Disk Portable

Corona Data Systems has incorporated a 5¼-inch 10MB Winchester hard disk drive in its latest 16-bit IBM PC-compatible portable microcomputer, the Corona PPCXT. The system sells for $4895 and comes bundled with MS DOS 2.0, GW Basic, MultiMate and PC Tutor.

The PPCXT, with Intel 8088 CPU, 256KB RAM (expandable to 512KB on a single board), hard disk drive, 360KB floppy disk drive and hard disk controller, has a built-in 80 character by 25 line display with nine-inch amber monitor and a detachable 83-key IBM PC-compatible keyboard. It has a graphics resolution of 640 by 325 pixels.

The unit is 9.6 inches high, 18.8 inches wide and 19.8 inches deep. It has an RS-232C serial port, Centronics-compatible parallel port and four IBM PC-compatible expansion slots.

For more information, contact Corona Data Systems Inc., 31324 Via Colinas, Suite 110, Westlake Village, CA 91361. Reader Service number 401.

## DEC Announces Color Pen Plotter

Digital Equipment Corp. has announced its first color graphics pen plotter, the LVP16 ($1995), for use with its Rainbow, Decmate, Pro series and Vax systems.

The plotter draws on either plain paper or transparencies and offers a choice of six colors from a palette of ten for paper, or seven for transparencies. At a maximum speed of 15 inches per second, the plotter has precise registration—hatch marks and colors don't run outside borders of pie charts, graphs or columns.

The desktop unit with RS-232C interface weighs 16 pounds and can communicate with systems supporting the HP-GL protocol. With DEC's Mini-Exchange, an interconnection device, several personal computers can share the plotter and other peripherals. It has 19 character sets, including ISO European, Katakana, ASCII and Roman 8 extensions.

For extensive text printing, an eavesdrop cable ($75) lets you connect the plotter to a serial printer and the printer to a host, thereby freeing the host for other communications needs.

Interface kits for Rainbow and Vax systems ($40) and Decmate and Pro series systems ($35) are available from Digital Equipment Corp., Maynard, MA 01754. Reader Service number 491.

## Eve II Runs CP/M And Apple DOS

The Eve II Personal Computer System uses a Z80A microprocessor running at a clock rate of 2.0 MHz and a 6502 microprocessor running at 1.023 MHz to make it compatible with both CP/M and Apple DOS.

The system comes complete with everything you need to begin computing right away. It includes the 64KB RAM (expandable to 256KB) computer that can produce 16 colors in the high-resolution mode, an orange monitor, an 80-column, 80-cps dot-matrix printer, a 163KB disk drive and four software programs. Other features include eight I/O expansion slots and eight programmable function keys as well as high-resolution (80 characters by 24 lines) and low-resolution (40 characters by 24 lines) capability.




*With everything you see pictured here for $2195, the Eve II personal Computer System is a tempting offer.*

The bundled software includes Pen Pal, a word processor; Instant Recall, a file management program; and Financial Facts and Money Tool, financial planning and budgeting aids.

The Eve II is serviceable through Xerox America and is a product of Computer Technology International Inc. (CTI), 200 Murray Hill Parkway, E. Rutherford, NJ 07073. Reader Service number 402.

## Button-Up Your IBM PC

"Hey, where's the reset button on this IBM?" Well, there isn't one, but with PC Reset ($89.95), you can install a true hardware reset button with a screwdriver and a pair of pliers. With PC Reset, you can reset the IBM without interrupting power or waiting for power-up.

For instantaneous reset, the PC Reset kit includes QuickOn, which lets you selectively bypass the memory test that the IBM PC goes through each time you turn it on or reset it.

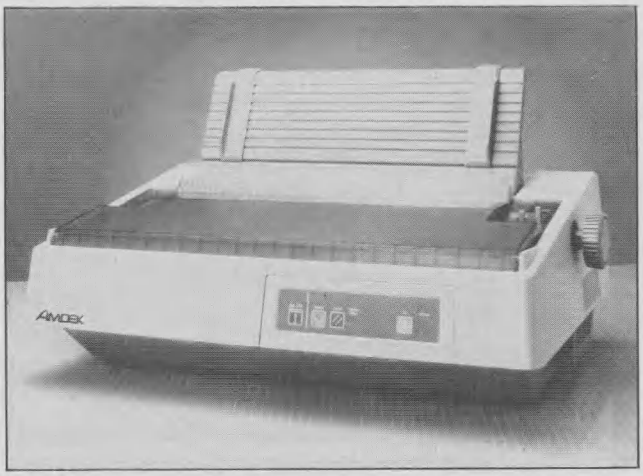
PC Reset comes with a money-back guarantee from Security Microsystems Consultants, 16 Flagg Place, Suite 102 PF, Staten Island, NY 10304. Reader Service number 408.

## Amdek Introduces Printer Line

Three daisy-wheel printers—the Amdek 5025 ($799), the Amdek 5040 ($1675) and the Amdek 5055 ($1990)—comprise the Amdek 5000 Series. The printers operate at 50 decibels, have Centronics parallel and RS-232C serial interfaces and come with interface cable. All printers in the series have a wide carriage able to handle 132 column forms for spreadsheet applications.

Each printer uses a daisy wheel with 125 characters. Print wheels for the 5040 and 5055 are interchangeable. A variety of typefaces are available, and through external software you can print up to 309 Teletex characters.

For more information on the 5000 series, contact Amdek Corp., Printer Products, 2201 Lively Blvd., Elk Grove Village, IL 60007. Reader Service number 416.




*Amdek introduces three wide carriage daisy-wheel printers that operate at a quiet 50 decibels.*

## No-Frills Modem

A modem is a modem is a modem. And if you don't need all the extra features some expensive modems offer, the Mark X ($169) may be the one for you. The 300 bps, autodial, autoanswer smart modem works with both tone and pulse dialing and operates on most popular software communications packages.

The Mark X works manually through the keyboard, or automatically, to answer and originate calls at 300 bps for Bell 103 compatibility. It detects dial tone and busy signals, automatically displaying dialing status on the CRT. With an RS-232C serial interface, it comes complete with a built-in cable and two telephone jacks.

For more information, contact Anchor Automation, 6913 Valjean Ave., Van Nuys, CA 91406. Reader Service number 413.

## Percom Portable Disk Drive

Weighing in at only three pounds, the battery-operated Percom Portable Disk Drive ($799) is bound to delight owners of briefcase portables such as the TRS-80 Model 100. The storage capacity of the 3½-inch disk drive is 500KB or enough memory to store about two hundred typed pages. The drive transfers data at 19,200 bits per second.

The system comes complete with interface software and operating system, Percom Interface, which resides in 8KB of disk ROM. A 4KB RAM program called Portable DOS lets you use the disk drive with the same simplicity as the Model 100's main menu. You load and store files using the function keys.

The complete package includes: the drive, connecting cable, ac adapter/

charger, manual, program disks (Percom Interface face Utilities) and program cassette (Portable DOS). An accessory Y-cable for applications requiring simultaneous use of peripherals on the RS-232C port and a cigarette lighter adapter/charger are also available.

For more information, contact Portable Computer Support Group, 11035 Harry Hines Blvd., #207, Dallas, TX 75229. Reader Service number 404.

## Change Peripherals At a Switch Flip

The Data Director acts as a port traffic cop that lets you switch one port to any of three devices, or one device to any of three ports. Flick its switch to position A, B or C to change peripherals instead of tugging at and plugging in interface cables.

Models are available for RS-232C serial ports (male and female) and Centronics-style parallel ports at $199 each from Computer Accessories, 7696 Formula Place, San Diego, CA 92121. Reader Service number 417.

## Apple II/II Plus Detached Extension Keyboard

Data Spec's Apple II/II Plus Detached Extension Keyboard ($299.95) has 97 function keys that can cut your programming time by 50 percent. The keyboard features a full ASCII character set with upper- and lowercase. Of the preprogrammed function keys, 20 are located on a separate key pad for easy access. Mathematical functions are next to the ten-key numeric pad. Function keys include command words such as for . . . next, print and operating system commands such as DIR, PIP and Type.



*Sharing ports and peripherals is easy with the Data Director.*

A ten-foot coiled cable attaches the keyboard to your computer. You can use it either to replace or supplement your existing system. Data Spec's computer support products are marketed by Alliance Research Corp., 18215 Parthenia St., Northridge, CA 91325. Reader Service number 405.

## Internal Modem For IBM Portable

Your IBM Portable Computer will have the practical edge once you install the PC Modem Half Card ($549), a 300/1200 bits per second (bps) autoanswer, autodial internal modem. The card fits inside the computer in one of its half-sized expansion slots.

Included with the system is Crosstalk XVI, a communications software package featuring automatic dialing and log-on, terminal emulation and automatic data capture. With the software, you can define and store a series of tasks for the modem in a single keystroke. The half-card is compatible with most communications software.

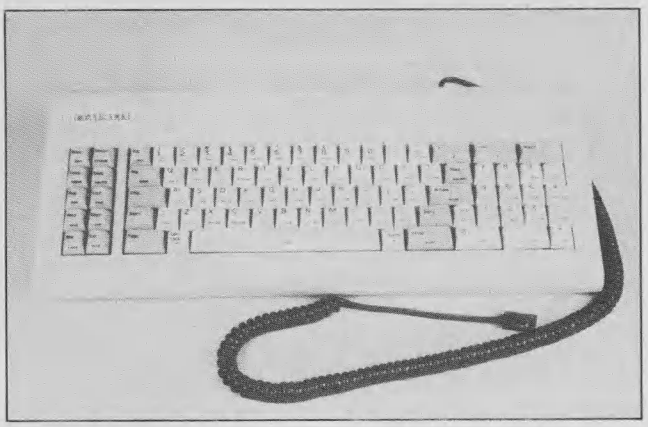
The half-card, software and phone cable are available from Ven-Tel Inc., 2342 Walsh Ave., Santa Clara, CA 95051. Reader Service number 407.

## RS-232C to IEEE-488 Interface

The CMC BUSSter RGA ($695) is a microprocessor-based interface that gives your RS-232C computer the ability to function as an IEEE-488 controller. It gives your RS-232C device the capability to individually address up to 15 IEEE-488 devices.

BUSSter RGA features include switch-selectable bit rates (300 to 19,200), parity and word length. You can configure the IEEE-488 port for talk and listen commands for an IEEE-488 address or secondary address from zero to 31. You can also address multiple devices at the same time. The unit is compatible with serial request, serial poll, parallel poll, remote/local, local lockout, device clear and device trigger interface functions.

It comes with case, power supply and standard GPIB and DB-25S connectors from Connecticut Micro-Computer, 36 Del Mar Drive, Brookfield, CT 06804. Reader Service number 418.



*The Data Spec Apple II/II Plus Detached Extension Keyboard gives you access to the full ASCII character set and 97 function keys all on one board.*

## Apples a la Modems

Apple Computer has released two autodial, autoanswer modems for use with all Apple II, Apple III, Macintosh and Lisa personal computers.

Apple Modem 1200 ($495) transmits data at rates of 300 and 1200 bits per second (bps), and Apple Modem 300 ($225) operates at 110 and 300 bps. Both models use an RS-232C serial interface with a nine-pin connector (the Apple II requires a serial interface card that adds about $75 to the price of either modem).

The modems, which fit under a standard telephone, are command compatible with Hayes Smartmodems and work with a variety of communications software, including ASCII Express, Data Capture, Access III, VisiTerm, Z-Term and Transcend 1,2,3.

Each modem comes with an accessory kit containing

installation and user's manuals as well as a system-specific connector cable. Apple II and Apple III kits include a menu-driven terminal program (requiring 64KB RAM) to access CompuServe, The Source and other information services.

The modems come with a 90-day warranty from Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014. Reader Service number 481.

## Protalker: IBM PC, S-100 Speech Synthesizer

ProTalker ($325) is a voice digitizer/synthesizer for IBM PC, IBM-compatible and S-100 computers that reproduces natural-sounding voice with proper intonation. ProTalker can record and play back voice messages in any language as well as sound effects or music.

ProTalker digitizes voice input, stores it on disk and synthesizes it for playback. Software includes a program for easy preparation and playback of voice files, a program for accessing the ProTalker from Basic and source code for assembly language driver routines.

For more information, contact Speech Ltd., 3790 El Camino Real, Suite 213, Palo Alto, CA. Reader Service number 410.

## Centronics: High Quality Dot-Matrix Printer

The Centronix Model H80 near-quality dot-matrix printer ($699) prints at 140 cps in draft mode and 27 cps in high-quality mode. The bidirectional logic-seeking unit supports pin-addressable graphics (single, double and quadruple density) and includes underline capability, pica, elite and proportional sets. With eight programmable character styles, it prints at five, six, 7.5, 8.6, ten, 12 and 17.2 cpi, and produces subscripts, superscripts and overstrike as well as condensed text.

Adjustable tractors handle fanfold paper from five to ten inches as well as cut sheet paper. An RS-232C interface is available as an option.

A wide carriage unit, the Model H136 ($899) prints 156 characters at ten cpi. In condensed mode, it prints 266 characters per line. For more information on either printer, contact Centronics Data Computer Corp., 1 Wall St., Hudson, NH 03051. Reader Service number 414.



*The Fujitsu DPL24 printer employs a 24-wire dot matrix head that can print up to 240 characters per second.*

## Letter-Quality At 80 cps From Fujitsu

With a 24-wire head, the Fujitsu DPL24 ($1950) offers letter-quality printing at 80 cps, correspondence-quality at 160 cps, draft-quality at 240 cps and high-resolution dot-addressable graphics. The wire head provides 360 by 180 dots per inch resolution for letter-quality characters, and 180 by 180 dots per inch resolution for correspondence characters and graphics.

The bidirectional logic-seeking unit operates with single-pass printing. It facilitates both cut sheet forms and continuous forms. An optional cut sheet feeder is also available.

The DPL24 prints letter-quality characters of Courier 10, Prestige Elite or boldface fonts at ten, 12 or 18 cpi. It comes with one resident font and four ROMs. Other features include automatic forms loading, downline load capability, visual paper-out and cover-open alarms and vertical and horizontal tabs. Dual interfaces (parallel Centronics and RS-232C) are standard.

For more information, contact Fujitsu America Inc., 3055 Orchard Drive, San Jose, CA 95134. Reader Service number 415.




*The Centronics H80 dot-matrix printer offers two print speeds, eight character styles, pin-addressable graphics and a slew of features.*

## CallText 5000: Talk to Me, PC

CallText 5000 ($2700), an IBM PC-compatible text-to-speech converter and telephone interface board, lets you access text data in voice form through any touch-tone telephone. It provides voice output with unlimited vocabulary for the PC, and you can program it to answer the telephone, obtain text data from a host computer and supply text data in voice form to the caller. It can also initiate calls.

It is compatible with the IBM PC XT bus interface and connects to the telephone network via a modular phone jack. An RS-232C serial port provides for external computer communications, and I/O drives facilitate writing programs in Basic, C and assembler languages under MS DOS.

The system comes with interface software from Speech Plus Inc., 461 N. Bernardo Ave., Mountain View, CA 94043. Reader Service number 409.

# BOOK REVIEWS

Edited by Nancy Kipperman

## The QX-10 Book: Version 1.18

David Barrett and
Michelle Mehterian
The Barian Company, 1983
12021 Wilshire Blvd., #148
Los Angeles, CA 90025
Softcover, 143 pp., $15.95

As an Epson QX-10 owner, I looked forward to reading *The QX-10 Book: Version 1.18*. No matter how familiar you are with a computer, you can always learn shortcuts and other such things. And, although the QX-10 is one of the more popular computers around, surprisingly few books are available describing its features and operation.

However, after reading *The QX-10 Book*, I feel I've just paid $15.95 for a piece of manufacturer's literature.

Granted, the Epson QX-10 deserves a lot of praise. It's a surprisingly liveable computer. The QX-10's Valdocs software permits you to start using it productively as a writing tool the day you take it home and plug it in.

### Needs Objectivity

However, in a book published by an independent publisher, I expect objectivity. I want to learn, not read words of praise and hints about how the future will be even better. If I want praise, I can read QX-10 product literature.

The tone of *The QX-10 Book* is another problem area. David Barrett and Michelle Mehterian are so determined to avoid an overly technical approach that they go overboard in the other direction. As a result, much of the book has a "Dick and Jane Meet Superman" simplicity, which is as irritating and difficult to read as overly complicated texts.

To make their point about how easy the QX-10/Valdocs combination is to operate, Barrett and Mehterian use simplistic stories about characters named Larry and Ralph and Jennifer—all of whom seem left over from the Hardy Boys or Nancy Drew books of the '50s.

For example, Ralph, a writer, buys a competitor's computer (with a thinly disguised WordStar word processing software package) and can't make it work. In frustration, he trades it in for an Epson QX-10, finds everlasting happiness and finishes his novel ahead of time.

Yet, a few pages later, *The QX-10 Book* becomes as complicated as any other book when it tries to explain the intricacies of CP/M or Epson's version, TP/M.

A final problem concerns the graphic layout of the book. In an attempt to create an open, readable book, it's printed on 8½ × 11-inch pages with just a single column of type across the page. Lots of leading or vertical spacing between lines is used to further create an open feeling.

Although the book succeeds in appearing open, it's extremely difficult to read. The wide columns require too many eye movements across the page, and it's hard to pick up the beginning of the next line.

It's a shame that *The QX-10 Book* suffers from these disturbing defects; it's both a necessary book and an authoritative book. The authors obviously know the QX-10 inside and out, and they're equally familiar with the ins and outs of Rising Star's Valdocs software.

### Saving Grace

The book is extremely helpful in the chapter entitled "Things Your Manual Never Told You. . ." The chapter did, indeed, tell me things my manual never told me. Although I've owned a QX-10 for over nine months, I learned important shortcuts and features I didn't know existed. *The QX-10 Book*'s chapter on communications is also very useful.

Should you buy *The QX-10 Book*? Until a more serious, balanced treatment appears, you probably should if you're at all interested in buying an Epson QX-10 or already own one. Hopefully, however, other books on the QX-10 will appear that don't talk down as much to the reader, but offer more solid information—including specific how-to examples using accounting and other CP/M software on the QX-10.

**Roger C. Parker**
**Hampton, NH**

## Electronic Life, How to Think About Computers

Michael Crichton
Alfred A. Knopf Inc., 1983
201 E. 50th St.
New York, NY 10022
Hardbound, 209 pp., $12.95

When I first picked up this book, I was quite prepared to dismiss it as another in the line of rather worthless celebrity computer books. After all, what could a physician, research scientist, screen writer, film director and producer possibly know about computers? Quite a bit, it turns out, and Michael Crichton's *Electronic Life, How to Think About Computers* serves as a good introduction to things computer for the novice and as a good collection of common sense and trivia for those who have a bit of computer experience.

### Computer Notes

The first major section of the book, entitled "Practical Matters A to Z," consists of a series of notes on various computer topics from afraid of computers ("Everybody is.") to Zenith: the final days of man before the machines take over? ("Human beings will always have something else to do. And so, for that matter, will their machines."). In between are admonitions on courseware ("This hideous neologism is a mark of the

computer Calvinist, as the cloven hoof is the mark of the Devil."), hardware ("If you can touch it, it's hardware."), skills, computer ("Learn to type."), and help ("The worst source is the telephone number of the manufacturer of the program or the machine. This number, somewhere in northern California, is always busy.") and a couple dozen other topics, in notes ranging from a paragraph to more than a page.

Crichton's advice is usually accurate, rooted in common sense and speaks of someone who has "been there." Reading this section of *Electronic Life* is a little like eating popcorn. While there's no great plot, it's hard to stop until you're finished.

The second major portion of the book is two appendixes (one for Apple IIs and the other for IBM PCs) that are hands-on tutorials for the absolute beginner, starting at the absolute beginning. (The Apple version starts with "Turn the video monitor on.") Included are several programs, which may be typed in, to show various powers of the computers involved, including a I Ching simulator. While I haven't entered and run each of the programs involved, I have given the tutorial to a couple of beginners who enjoyed it.

The book ends with a bibliography and a couple of pages of definitions. The definitions in this so-called Grouchy Glossary are sometimes not easy (particularly for the beginner) to understand (a bit is defined as a "single switch inside a computer"); sometimes oversimplified (a kilobyte is defined as "One thousand bytes of information"); and sometimes either incomplete or just wrong (column is defined as "the number of characters on the monitor screen").

However, if you need a present for someone who should (or who would like to) learn more about computer basics or for a computer expert's spouse (see Crichton's sympathetic article on "Widow, Computer"), a copy of *Electronic Life* may be just the thing.

Pick it a few days early, though, because you'll probably take just a peek and then read the whole thing yourself.

**Barry D. Bayer**
**Homewood, IL**

## The Model 100 Book: A Guide to Portable Computing

Jonathan Erickson and
Robert J. Sayre
Osborne/McGraw-Hill, 1984
2600 Tenth St.
Berkeley, CA 94710
Softcover, 380 pp., $17.95

Authors of *The Model 100 Book* are J. Erickson, a senior editor at Osborne/McGraw-Hill, former newspaper reporter and technical writer, and R. Sayre, a software engineer. Together they combine the elements of their professions in just the right proportions to produce one of the most useful books written for any computer.

This mixture may not be what everyone interested in computers wants. However, the majority of Model 100 owners will find enough ideas, programs, hints and information to pay for the cost of the book.

### Not Hard-Core Info

If you're looking for hard-core information about the Radio Shack Model 100 portable computer, pokes, peeks, ROM calls, assembly language and so on, then this book probably isn't for you. If you're interested in putting your Model 100 to wider use in the office, home or on the road, then this is an invaluable reference.

The book is divided into four sections—Traveling With Your Model 100, The Model 100 in the Office, Using the Model 100 at Home and The Model 100 in the Classroom—and has three appendixes. Each section begins with a situational illustration outlining a hypothetical set of problems and the rest of the section is a chapter-by-chapter set of possible solutions and suggestions to each problem. Each chapter outlines the particular hardware requirements that you'll need (memory requirements, modem, printer, cables and so on). Next, a program or procedure is listed and explained in detail. The program is analyzed step by step so that you can modify the program if necessary. Finally, step-by-step instructions on how to use the program and examples of use are given.

A few things ought to be mentioned about the way the book is put together. Each person reading the book will relate to a number of hypothetical problems, but few real people will encounter every problem. This is to be expected with any comprehensive book, but I'm impressed with the choice of problems. Even if you never need this particular solution to a problem, it's still worth reading the section because the programs are so open-ended that they easily apply to other problems.

The authors also give ideas for possible variations. I found instances in the solutions where I hadn't realized a service existed or how easy something might be because I hadn't considered the problem as relating to a Model 100 at all. This is perhaps the greatest value of the book: It shows you how to use the computer the way it should be used. In particular, it shows you ways to use the Model 100 computer, taking advantage of its individual assets.

### New Ideas

While *The Model 100 Book* doesn't teach you how to program or give details about computer hardware, even the most dedicated hacker will find some new ideas. The focus of the book is on how to make use of the Model 100. You need no prior knowledge of programming to operate these programs or implement the ideas. It takes you step by step through everything but doesn't come across in a condescending manner. It provides every detail that you need, from how to hook up an acoustic coupler, modem or printer to how to save a program on tape.

The programs and applications include a schedule and expense program for business trips, details

on how to get airline information, how to send and receive electronic mail, a currency conversion program, how to obtain stock quotes, how to set up and manage computer conferences, a home expense manager program, electronic shopping, a loan manager program, accessing electronic research, encyclopedia, periodical and other information services and a wide variety of other programs, ideas and applications.

Overall, I'd recommend *The Model 100 Book* to anyone who owns a Model 100. This book shows you a number of ways to get more than your money's worth. It's clearly written, well thought out and is an invaluable aid to using the Radio Shack Model 100 in the home, classroom or office.

**Guy Wright**
**Temple, NH**

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## Microcomputer Programming with Microsoft BASIC

Robert G. Crawford and
David T. Barnard
Reston Publishing Co. Inc., 1984
11480 Sunset Hills Road
Reston, VA 22090
Softcover, 407 pp., $15.95

## The MBASIC Handbook

Walter A. Ettlin and
Gregory Solberg
Osborne/McGraw-Hill, 1983
2600 Tenth St.
Berkeley, CA 94710
Softcover, 275 pp., $17.95

Basic (Beginner's All-purpose Symbolic Instruction Code) has emerged as the language of choice for most user-programming on today's microcomputers. Although the limitations of this high-level programming language restrict its utility for programmers who must consider speed of execution when dealing with large data files or highly iterative numerical routines on mainframe computers—Basic seems perfectly tailored for the average user who needs a simple programming language to handle a variety of numerical or interactive tasks on a microcomputer.

Most micros come with at least one version of Basic, and perhaps the most widespread "dialect" of this language is MBasic (a version of Basic distributed by Microsoft Corp.). For example, MBasic is supplied with the IBM PC, Kaypro computers, Apple II (Applesoft Basic), TRS-80 and many others.

Invariably, your computer manufacturer has thoughtfully supplied a book to explain MBasic for you. Unfortunately, it won't.

No one I have ever met has actually learned to program in Basic from using the manufacturer's supplied manual. In fact, just the first chapter of any one of these manuals is usually sufficient to make prospective programmers file their Basic disk away for good. And that's bad. Programming in Basic is very useful and quite easy to learn, given a little help.

### Learn to Program

Both of these books on MBasic can help you learn to program your microcomputer. *Microcomputer Programming with Microsoft BASIC (MPWMB)* is a beginning college-level text that treats Basic as just one type of programming language that's helpful in learning general programming techniques. In particular, this book means to teach the use of algorithms in problem solving. This is a more complicated approach to the problem of learning Basic itself, but it offers the reader a solid grounding in the heuristic techniques used to solve problems of great complexity.

*The MBASIC Handbook (TMH)*, on the other hand, provides an in-depth introduction to the MBasic programming language without any discussion about problem solving at all. What this book *does* provide is a discussion of several of the more advanced features of MBasic, leading to the goal of producing menu-driven programs that can be easily used by persons other than the programmer—an admirable goal, and one not addressed by most books on Basic.

Both books are valuable tools that can be used along with your computer's Basic manual. Even though these books restrict their discussion to MBasic, your machine's version of MBasic may be slightly different than that presented in the text. (MPWMB provides an appendix that lists the different dialects of MBasic for the various microcomputers.) Both books furnish a sequence of example programs, tutorials and exercises. Since your computer's MBasic manual at least provides the precise syntax for each Basic command, you should use it as you would a dictionary to follow the examples in either of these books. (So, the manual *is* good for something!)

MPMWB is the more challenging of the two for the beginning programmer. After introducing algorithms, it progresses through a graded series of problems, often showing more than one approach to the solution. The last part of the book examines a wide variety of applications, including numerical analysis, sorting techniques, graphic output and game design—here is where you can learn to program your own adventure. What is missing from this book is a simple nuts-and-bolts description of MBasic features, such as how to edit and debug your programs.

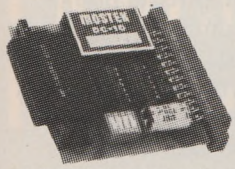
Several aspects of this book's layout are not as helpful to the reader as they might be. For example, the programs aren't printed as they would actually look (that is, printed from a dot-matrix or other printer). Also, the authors haven't introduced each new command with a summary statement about its syntax and usage. And there is not a single flow chart to be found. (This is very peculiar for a text devoted to algorithmic technique.)

### No Reason

*The MBASIC Handbook*, true to its title, offers a very complete description of this language. What it lacks is any discussion about the reasons for programming in the first place. While this book has a place in every serious MBasic programmer's library, it fails to

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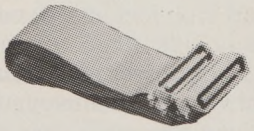
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| CDB25P-10-S | L | 10' | 15.49 |



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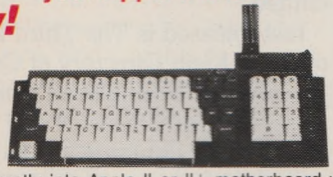
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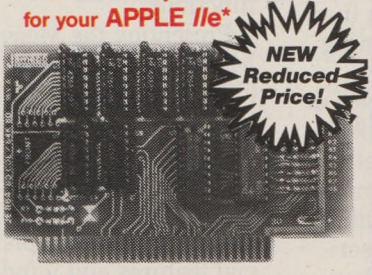
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provide any information on how and when to solve a problem through Basic. Clearly, some discussion about problem solving is useful in any introductory computer-language text.

TMH has three parts. In Part I, the primary commands (input and output statements, variables and loops and functions) are introduced, and MBasic's valuable line editor is explained. In Part II, subroutines, file handling, logical operators and user-defined functions are discussed, and you're introduced to debugging techniques. Part III offers an extended lesson on how to combine programs with a menu driver and accurate interactive user documentation so that others can readily use your programs.

**Useful Tools**

TMH has several useful design features; all program listings and output are displayed just as they would look from a dot-matrix printer. An appendix describes the syntax of all MBasic commands, and another, error messages. The authors provide an index of the programs in the text, and the longer program examples are available on a disk (some of the programs are several hundred lines long). Lastly, the authors pay attention to the demands of style in programming. Nothing helps more in the debugging of a long program than a keen attention to programming style and readability.

Both of these books have well-defined goals and are useful tools. *The MBASIC Handbook* is better suited to the MBasic programmer, and *Microcomputer Programming with Microsoft BASIC* to the serious general programmer. Either one is several leaps ahead of the manuals provided with your computer.

**Bruce Caron**
**Santa Barbara, CA**

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## From the MC Bookshelf

Joel Shurkin begins at the beginning and traces the history of the computer in his book, *Engines of the Mind* (W.W. Norton & Co. Inc., 500 Fifth Ave., New York, NY 10110; $17.50). He concentrates on the people responsible for today's computer age, their fight for recognition and fame, and the development of many of today's leading computer manufacturers. It's a history book that reads more like a novel.

*Interfacing to the IBM Personal Computer* by Lewis C. Eggebrecht (Howard W. Sams & Co. Inc., 4300 W. 62nd St., Indianapolis, IN 46268; $15.95) provides information and techniques that can be used in many different projects. It presents an overview of the PC system and then more detailed descriptions of "its electronics, its functions and its interfaces." Also included are two design projects: a PC bus extender and a simple bus analyzer card extender.

Robert W. Stat's new book, *PCjr: The Affordable IBM,* claims to "develop a rapport among the user, the text and the computer." It's a beginner's book and includes a floppy disk and 15 ready-to-run home applications programs. Written in a humorous style, the book (Banbury Books Inc., 353 W. Lancaster Ave., Wayne, PA 19087; $29.95) teaches the reader how to program in Basic, familiarizes him with the machine's operating system and shows the built-in editing functions.

*Presenting the Macintosh* by Merl K. Miller and Mary A. Myers (dilithium Press, 8285 S.W. Nimbus, Suite 151, Beaverton, OR 97005; $5.95) takes you step by step through the world of the Mac, offering advice on whether or not to buy it as well as explaining its special features and windows—a whole chapter is devoted to MacPaint alone.

Two books dealing with CP/M have arrived: *CP/M for the Kaypro* by James T. Perry and Robert F. McJunkins (Reston Publishing Co. Inc., 11480 Sunset Hills Road, Reston, VA 22090; $16.95) and *A Practical Guide to CP/M* by Carl Townsend (dilithium Press, 8285 S.W. Nimbus, Suite 151, Beaverton, OR 97005; $14.95). The former also includes an introduction to dBase II and promises to appeal to both the first-time and experienced user of CP/M. Townsend's book is intended for the CP/M user with some experience and for the serious CP/M user.

*The Complete Guide to Microsystem Management* by Steven K. Robbins (Prentice-Hall Inc., Englewood Cliffs, NJ 07632; $16.95) offers "detailed coverage of such matters as vendor relations, system organization, installation, supplies, human factors, insurance and maintenance."

On the software side, *The Elements of Friendly Software Design* by Paul Heckel (Warner Books Inc., 666 Fifth Ave., New York, NY 10103; $8.95) is billed as "a landmark guide to the art of writing user-oriented software." This book is based on Heckel's 20 years of experience in the field of software design. *Current Practices in Software Development: A Guide of Successful Systems* by David King (Yourdon inc., 1133 Avenue of the Americas, New York, NY 10036; $28) is a summary of the latest methods available in the systems development process. King recommends "a practical system development life cycle as a framework in which to apply the structured techniques." Discussions of the structured methodologies of Jackson, Gane and Sarson, Yourdon, DeMarco and Warnier-Orr are included.

Just released is *The Third Edition of the S. Klein Directory of Computer Graphics Suppliers: Hardware, Software, Systems and Services,* which contains 224 pages and identifies more than 500 supply sources (S. Klein Directoy of Computer Graphics Suppliers, 730 Boston Post Road, Dept. D, PO Box 89. Sudbury, MA 01776; $60).

*Terminals & Printers Buyer's Guide* by Tom Webster (McGraw-Hill Book Co., 1221 Avenue of the Americas, New York, NY 10020; $19.95) offers "detailed introductory and buying guide information on alphanumeric and graphics terminals as well as hard copy devices such as printers and printing terminals."

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# CALENDAR

## July 3–5
## London, England

Billed as Britain's first exhibition devoted entirely to the IBM PC, the **PC User Show** will debut in London July 3–5. The show is designed to meet the needs of professional computer users. More than 100 vendors and dealers of IBM PC and PC-compatible systems plan to exhibit their products.

For more information, contact Peter Walker Associates, 32 Fitzroy Square, London, England W1P 5HH; 01-388-9871.

## July 7–8
## River Grove, IL

The Chicago Area Music Teachers Association and Triton College are cosponsoring their second annual workshop—**The Role of the Microcomputer in Music Education**.

The conference, designed to cover everything from introductory material to advanced methodologies, will feature 80 sessions addressing topics like microtuning, computerized music theory and composition and using the digital synthesizer. Several noted music and computer specialists are also slated to speak at the workshop.

For more information, contact Pearl Anshell, conference coordinator, Triton College, 2000 5th Ave., River Grove, IL 60171; 312-386-7733.

## July 9–12
## Las Vegas, NV

The Las Vegas Convention Center will play host to this year's **National Computer Conference**, scheduled for July 9–12. The conference will again feature information processing exhibits and technical sessions.

For more information, telephone Ann Marie Bartels at 703-558-3612.

## July 15–18
## Chicago, IL

Issue, the International SPSS Software User's Exchange, has scheduled its 1984 national conference, **Issue '84**, for July 15–18 in Chicago.

The conference is designed to be an opportunity for all users of SPSS software to meet and discuss new SPSS software, including newly released products for the IBM PC XT. **Issue '84** will feature poster sessions, roundtable discussions, training seminars, workshops and paper presentations.

For further information, call or write Issue at 444 N. Michigan Ave., Chicago, IL 60611; 312-329-2400.

## July 23–27
## Minneapolis, MN

The 11th annual conference on computer graphics and interactive techniques, **Siggraph '84**, will kick off in Minneapolis July 23–27.

The conference offers an exhibit, film and video shows, panel sessions featuring noted academic leaders, a computer graphics art show and the premiere of the first totally computer-generated Omnimax film.

For more information, contact the **Siggraph '84** Conference Office, 111 E. Wacker Drive, Chicago, IL 60601; 312-644-6610.

## July 23–27
## Boston, MA

The Copley Plaza Hotel is the site of this year's **Summer Computer Simulation Conference**. Keeping with the New England location, the conference emblem is a "simulation minuteman," representing a dedicated core of simulationists. The conference will be July 23–25, followed by professional development seminars on July 26–27.

The conference will feature technical sessions, special plenary presentations, panel discussions, vendor exhibits and a special program by the Dutch Benelux Simulation Society. The keynote speaker is Frederic G. Withington of Arthur D. Little Inc.

For more information, contact The Society for Computer Simulation, PO Box 2228, La Jolla, CA 92038; 619-459-3888.

## July 27–29
## St. Charles, IL

The Heath/Zenith User's Group has chosen the Pheasant Run Resort in St. Charles, IL, as the site of this year's **International User's Group Conference** on July 27–29.

Call or write the Heath/Zenith User's Group, Hilltop Road, St. Joseph, MI 49085; 616-982-3463.

## August 2–5
## Tampa, FL

Compushows Inc. continues its 1984 schedule with the first annual **Tampa Bay Computer Show and Office**

# CALENDAR

**Equipment Exposition**, which will be at the Curtis Hixon Convention Center in Tampa. The shows cover hardware and software for business, industry, government, education and personal use.

For more information, telephone 800-368-2066, or from within Maryland, 301-263-8044.

### August 13–16
### Madison, WI

The University of Wisconsin-Madison is coordinating a **Microcomputers and High Technology in Vocational Education Conference**, which will be at the Concourse Hotel, Madison, WI.

The conference itself runs August 14–16; formal classes start on August 13. More than 100 concurrent sessions will be offered, dealing with instructional and administrative computing in vocational education programs. Also on the agenda are presentations, videotaped programs, hardware and software displays and a keynote speech by Dr. Gene Bottoms.

For further information, contact Dr. Judith Rodenstein or Dr. Roger Lambert, University of Wisconsin-Madison, 964 Educational Sciences Building, 1025 W. Johnson St., Madison, WI 53706; 608-263-4367 or 608-263-2704.

### August 19 and 20
### New York, NY

### August 22 and 23
### San Francisco, CA

The Yankee Group continues its 1984 seminar schedule in August with two **Telecommunications** conferences. For more information, contact Lisa Caruso, The Yankee Group, 89 Broad St., Boston, MA 02110; 617-542-0100.

# CLUB NOTES

### Venezuelan PCUG

A personal computer user's society has been started in Barcelona-Puerto La Cruz, Venezuela, to promote interest in computer science, to increase understanding of the uses of personal computers and their applications and to promote relevant research in this field. This society has 42 members and meets every other Saturday at 10 a.m. Society members own several brands of computers, including Apple and Epson QX-10. A monthly newsletter and translations of magazine articles are planned.

For further information, contact Osvaldo Briceno, president, Sociedad de Usuarios de Computadoras Personales, PO Box 56, Barcelona, Venezuela 6001-A.

### Atlanta Computer Society

The Atlanta Computer Society Inc. offers regular meetings for all members, as well as user's groups for members who share more specific and detailed interests and communication through a free computerized bulletin board (CBBS-Atlanta, 404–6365–6130) and a monthly newsletter. User's groups include 8080, Z80 and CP/M; 68XX (6800, 6809, Color Computer, 68000); Robotics; Atari/East; Cobb Bunch; Timex Sinclair; Print Buffer Group; and the Epson Group. For more information, contact Atlanta Computer Society Inc., PO Box 888771, Atlanta, GA 30356.

### Western Regional HUG Conference

The Pomona Heath User's Group of 110 members is sponsoring the first Western Regional HUG Conference on November 10 and 11, 1984, at the Disneyland Hotel in Anaheim, CA. All Heath/Zenith Computer users are invited to attend.

The PHUG members meet on the fourth Thursday of the month at the Pomona Heathkit Electronic Center, put out a monthly newsletter and support a 24-hour RCP/M Bulletin Board (714–624–5191). For further information about Pomona HUG or the HUG conference, contact Herb Friedman, WRHC Coordinator, 1555 N. Orange Grove Ave., Pomona, CA 91767.

### First Attache User's Group

Attache portable computer users can now network with others to share experiences, tips, news and support. FAUG, the First Attache User Group, has an 800 number for users who need help. Subscribers to the system may call 800-TagrTut, ext. m460, to leave help messages with the staff of the FAUG newsletter. FAUG locals are established in New York, Los Angeles, San Francisco, Chicago, Houston, Paris, London and Tokyo. Subscribers receive the monthly newsletter, networking protocol disks and library access for $42 a year. Send to FAUG, 1827 Haight St. #16, San Francisco, CA 94117–2791.

# CLUB NOTES

## New Canaan, CT, IBM PC Club

The Connecticut IBM PC User's Club meets monthly and offers a club bulletin board (203–966–8869), a monthly newsletter and club software to its members. For additional information, contact Sherry Foulger, PO Box 291, New Canaan, CT 06840–0291, (203-744-4002).

## New Address/ Old Club

IPCP inc., the original national user's group for the IBM PC with more than 1000 members from every state and many foreign countries, has a new address. Those who are interested in subscribing to International Personal Computer Owners newsletter should address correspondence to PO Box 5100, Poland, OH 44514–0100.

## SAGE User's Group Formed

Nearly 100 Sage users formed a Sage User's Group during February's first annual Sage Faire in Reno, NV. Their primary purpose is to exchange information and foster the growth of knowledge in microcomputing. General meetings, information exchanges, an electronic bulletin board service and a newsletter are featured offerings. Address correspondence to Sage Computer, 4905 Energy Way, Reno, NV 89502.

## Central Texas Group

The Central Texas PC User's Group is open to anyone interested in the IBM Personal Computer. Dues are $35 annually and newsletter subscriptions for anyone living outside a 50-mile radius of Austin are available for $15 per year. Address correspondence to PC Plus, Centex PC UG, PO Box 10169, Austin, TX 78766–1169.

## H.O.T. TRS-80 Club

The Heart of Texas TRS-80 Club meets monthly at Poppa Rollo's Pizza, 703 N. Valley Mills, at 7 p.m. Membership dues of $10 include voting privileges and a newsletter subscription. For further information, write H.O.T. TRS-80 Club, PO Box 1923, Waco, TX 76703.

## Commodore Computer Users

Worldwide Commodore User's Group is currently sponsoring membership drives to establish affiliated groups in these Pennsylvania cities: Norristown, Montgomeryville, Pittstown, Boyertown and Reading. No addresses are available at present for these groups, but information can be obtained from Worldwide Commodore User's Group, PO Box 337, Blue Bell, PA 19422.

## New England Computer Society

The New England Computer Society is the oldest and one of the largest organizations of its type in its area with about 200 members. Meetings are on the first Wednesday of each month at 7 p.m. in the MITRE Corp. cafeteria, Bedford, MA. Membership is $20/year, half-price to students and the unemployed. The society publishes a monthly newsletter and offers many special interest groups. Inquiries may be addressed to New England Computer Society, PO Box 198, Bedford, MA 01730.

## London's HX-20/ QX-10 UG

The HX-20/QX-10 (International) User's Group communicates through a monthly newsletter that publishes information on new products and the availability of software/ peripherals. An electronic mail facility is available for members, and program exchanges and user support are encouraged. Contact Terence L. Ronson, Chairman, HX-10/QX-20 (International) User's Group, 25, Sawyers Lawn, Drayton Bridge Road, London W13 OJP for more information.

## Bluegrass IBM PC User's Group

The Bluegrass IBM PC User's Group meets the fourth Saturday of each month at the University of Kentucky Computing Center in Room 210, McVey Hall, at 1 p.m. The club maintains a software library and publishes a monthly newsletter. Annual dues are $12 a year for regular members and $6 for each additional family member and for students. For more information, contact Diane Skoll, Room 72, McVey Hall, University of Kentucky, Lexington, KY 40506–0045.


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FOR SALE: CP/M user disk for C-64, $12 each. Boonpat Vattan, 3524 Cottman Ave., Philadelphia, PA 19149 (215-331-8138).

WANTED: TRS-80 software for Model III, 48KB, two floppies. Aaron Paul, PO Box 581, Alexandria, LA 71301.

FOR SALE: IBM portable compatible Hyperion; 256KB RAM; two (320KB) drives; built-in modem; 1-2-3; Aladin database; word processor; BasicA; communications software; and much more. Marv (612-332-0001 or 612-933-3391).

FOR SALE: CAT acoustic modem, $85. IDS 445G printer, $350. Keith (603-924-7981) eves.

FOR SALE: Heath ET-3400A Microprocessor, EWA-3400, ETA-3400-1 optional chip set with EE-3401 Microprocessor course and manuals. Cost $495, will take best offer. Heath H-88-5 cassette interface board with manual and cassette tapes. Will take best offer. Send SASE to Robert Sitton, 507 W. 9th St., Cisco, TX 76437 or will send UPS COD.

WANTED to buy: *A Companion to Robert Uiterwyk's BASIC Interpreters* by David Gardner. Reply to D. Matton, 304 Northland Ave., Stillwater, MN 55082.

WANTED: Atari computer hardware and software. Will buy your Atari gear or trade for mine. Originals only. Send list of what you have or ask for my list for trade. Allen Harberg, Box 38, E. Glastonbury, CT 06025.

FOR SALE: Osborne I computer peripherals and software; 64KB, double-density drives (202KB each), screen pac (52, 80, 102 columns), Quadram Microfazer printer buffer (256KB). Software includes: WordStar, Spellguard, Grammatik, Documate/Plus, Footnote, MailMerge, SuperCalc, Superfile, dBase II, Math, M Basic, C Basic, Microlibrarian, Touchtype, A $3000 plus value. Offers to Knowles, Salt Lake City, 801-363-4203.

FOR SALE: Magic Bind/Magic Index, WordStar version. A merge/formatter/indexer for CP/M-80, reviewed in March 84 *Microsystems*. New, with registration, does not work with my printer. Requires a Diablo/NEC compatible printer. $250 ($295 value). John D. Mill, 80 Old Lowell Rd., Westford, MA 01886, 617-692-4467.

WANTED: Back issues of *73 Magazine*, October, 1960; *Access*, Vol. I. Nos. 1, 2, 4 and 5 (1982); *Commander*, 1983, and January, 1984. Buy borrow or rent *Access*; others, buy only. Neil A. Benson, 6855 Lamar Ave. S., Cottage Grove, MN 55016-1630.

WANTED: Atari 800 and/or peripherals for Atari 800. Must be in good working order. Bob Hendrickson, 12710 Prospect Knolls Drive, Bowie, MD 20715.

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# NEWS WINDOW

By Eric Grevstad

MacCrash: It was the first third-party application for Apple's Macintosh, but Microsoft Corp. was obliged to recall its first shipments of Multiplan. The spreadsheet program ate data when users tried to save their work under certain conditions. Microsoft has promised to ship registered owners a revised version and vows there'll be no more MacCidents.

---

Companies not to buy stock in: Franklin Computer Corp., despite writing its own DOS and settling its lawsuit with Apple, has laid off 70 employees; president Avram Miller has resigned, and the appearance of new products—an IBM compatible has been expected for more than a year—seems uncertain. Similarly, Eagle Computer Corp. settled a lawsuit with IBM but lost $7 million to $9 million in the first quarter of 1984. The firm has cut its PC compatibles' prices, looking forward to the introduction of its $4495 Turbo PC, which features a ten-megabyte hard disk and two to three times the operating speed of an IBM.

And Grid Systems Corp. fell $7 million short of its sales projections for 1983; its president, marketing director and a director of sales have left, while its high-powered, high-priced portable hasn't caught on outside government agencies.

---

ComputerLand and Radio Shack Computer Centers were slugging it out for top honors (462 and 418 stores, respectively), but Future Computing Inc. counted an even more impressive total: There were 3152 computer specialty stores in the United States as of December 1983, up from about 2500 last June. By late 1985, the Richardson, TX, market analysts predict nearly 5000 micro outlets; by 1989, about 7000.

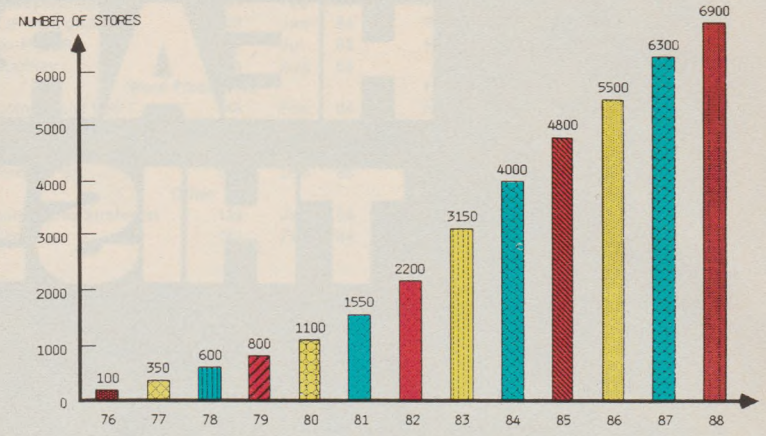



*Table. U.S. computer stores. Source: Future Computing Inc.*

Commodore, which reportedly plans to offer home computer buyers a choice of five machines at $100, $200, $300, $400 and $500, unveiled the first product—the Commodore 16, a 16KB replacement for the VIC-20—at a show in Hanover, West Germany. (Presumably, the 64, 264 and 364 will fill the $200 through $400 notches.)

Commodore also showed its transportable PC clone (actually a Hyperion clone, made under license from Bytec) and a 256KB, Z8000-based Unix system with a high-resolution 15-inch color monitor. Expect these machines, and perhaps a lap-sized portable, in the United States by next year.

---

It was inevitable that Epson would do something about the HX-20 portable's four-line, 20-column LCD screen; at the Hanover show, Epson introduced the PX-8, a microcassette-equipped portable with a flip-up eight by 80 display. MicroPro supplied versions of WordStar and CalcStar on PX-8 EPROM chips.

Meanwhile, stopping by Peterborough, Tandy's Director of Market Planning Ed Juge confirmed that Radio Shack will have not one but two successors to the TRS-80 Model 100—a 100-like machine in the four-pound, sub-$1000 range, perhaps with a bigger screen, and a heavier, high-end portable along the lines of Hewlett-Packard's HP-110. They'll appear late this year or early in '85.

---

Coleco, after laying off 1300 workers and finishing Adam's long, public debugging, has turned around. The West Hartford, CT, firm lost $35 million in the fourth quarter of 1983, but managed a net income of $4.4 million on sales of $186 million in the first quarter of 1984. Put together, revenue from the Adam computer and ColecoVision video games about equaled that from sales of 2.5 million Cabbage Patch Kids.

Coleco has also launched a public relations offensive, taking Adam seminars directly to consumers around the country and forbidding company executives to give interviews. Actually, the computer press have unanimously said that an integrated home system is a great idea; Coleco's mad because they've also pointed out that Adam flaps, squawks and goes gobble gobble.

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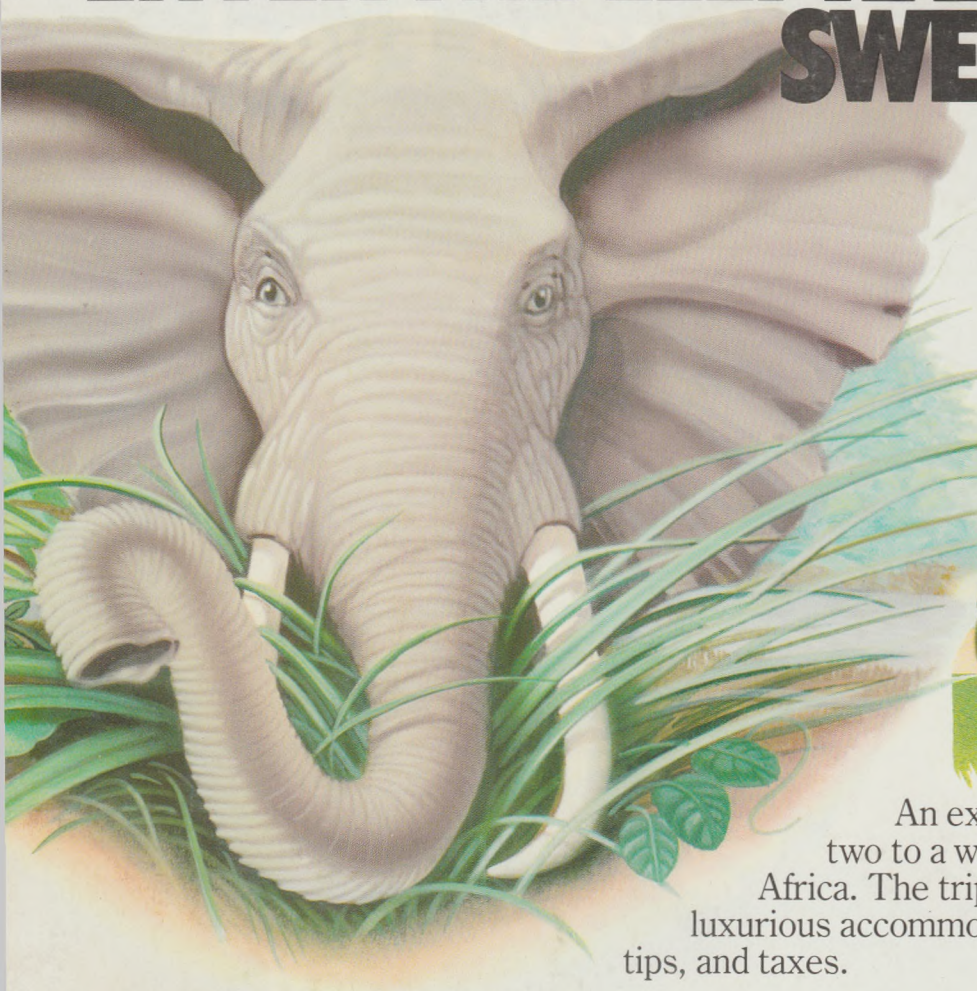
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